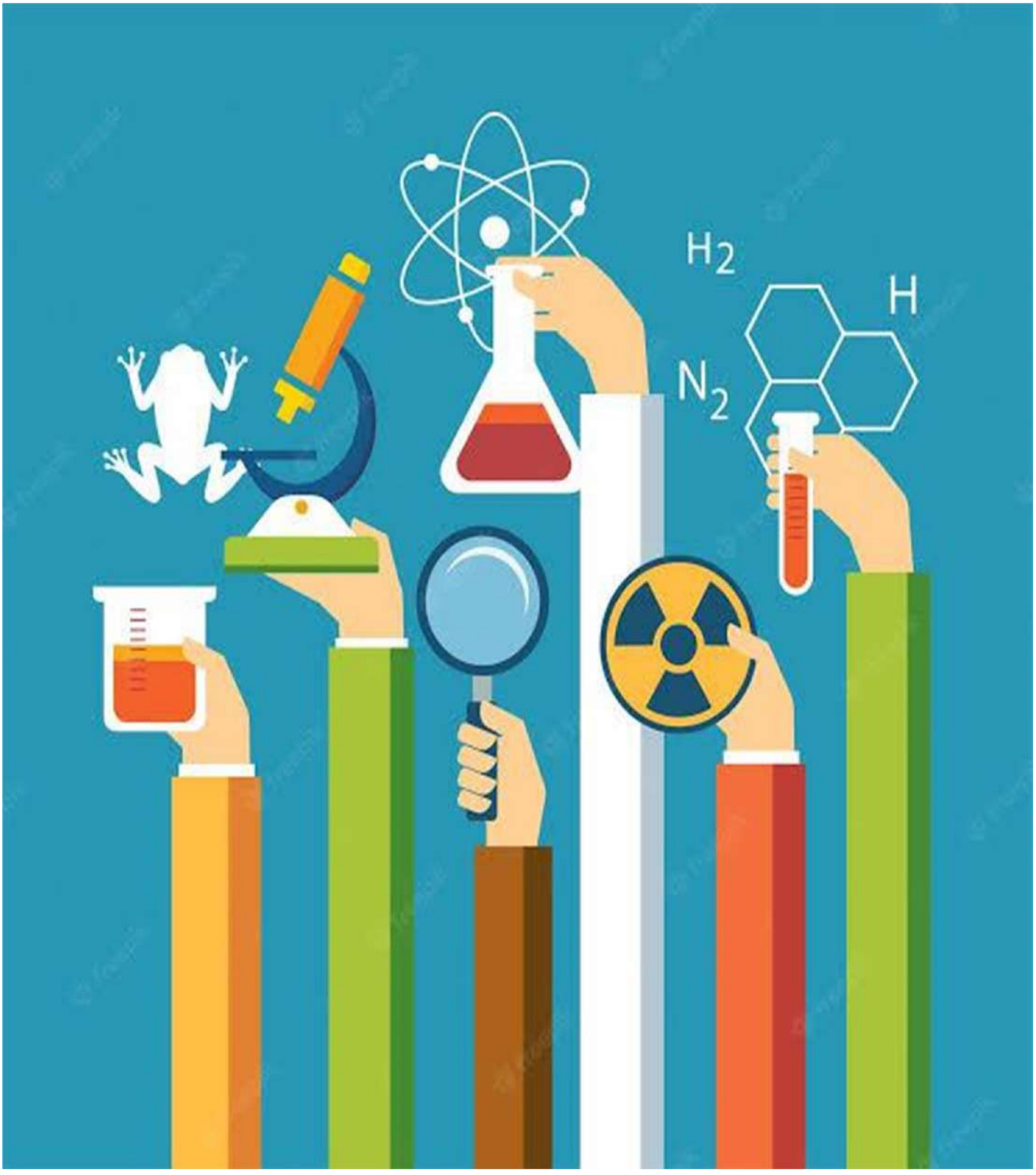
DAV INSTITUTIONS, ODISHA ZONE
SUPPORT MATERIAL
SCIENCE
CLASS- X



PREFACE

In view of the approaching AISSE (CBSE Board Examination)-2023, DAV Institutions, Odisha Zone has designed “SUPPORT MATERIAL” in SCIENCE for the students of class-X.

The content of these learning resources is embedded with TEN SETS of Sample Papers and Marking Schemes inclusive of CBSE released SQP(s) and MS(s). Besides,the booklet contains the RATIONALISED CBSE SYLLABUS & THE DELETED PORTION for the CBSE BOARD EXAMINATION, 2023 AND STUDY MATERIALS. All possible care has been taken in the process of preparation tomake the study materials error free, persuasive and effective, accelerating the self- confidence of the examinees by solving the Assertion-Reasoning, Competency Based &Case Based Questions and supporting their pedagogical ground work.

“Self-confidence, hard work and strong determination are the keys to success”

Content

SYLLABUS (2022 –23)

Unit I: Chemical Substances-Nature and Behaviour

Chemical reactions: Chemical equation, Balanced chemical equation, implications of a balanced chemical equation, types of chemical reactions: combination, decomposition, displacement, double displacement, precipitation, endothermic exothermic reactions, oxidation and reduction.
Acids, bases and salts: Their definitions in terms of furnishing of H^+ and OH^-ions, General properties, examples and uses, neutralization, concept of pH scale(Definition relating to logarithm not required), importance of pH in everyday life; preparation and uses of Sodium Hydroxide, Bleaching powder, Baking soda, Washing soda and Plaster of Paris.
Metals and nonmetals: Properties of metals and non-metals; Reactivity series; Formation and properties of ionic compounds; Basic metallurgical processes; Corrosion and its prevention.
Carbon compounds: Covalent bonding in carbon compounds. Versatile nature of carbon. Homologous series. Nomenclature of carbon compounds containing functional groups(halogens, alcohol, ketones, aldehydes, alkanes and alkynes), difference between saturated hydrocarbons and unsaturated hydrocarbons. Chemical properties of carbon compounds (combustion, oxidation, addition and substitution reaction). Ethanol and Ethanoic acid (only properties and uses), soaps and detergents.

Theme: The World of the Living
Unit II: World of Living

Life processes: 'Living Being'. Basic concept of nutrition, respiration, transport and excretion in plants and animals.
Control and co-ordination in animals and plants: Tropic movements in plants; Introduction of plant hormones; Control and co-ordination in animals: Nervous system; Voluntary, involuntary and reflex action; Chemical co-ordination: animal hormones.
Reproduction: Reproduction in animals and plants (asexual and sexual) reproductive health-need and methods of family planning. Safe sex vs HIV/AIDS. Child bearing and women's health.
Heredity and Evolution: Heredity; Mendel's contribution-Laws for inheritance of traits: Sex determination: brief introduction: (topics excluded -evolution; evolution and classification and evolution should not be equated with progress).

Theme: Natural Phenomena
Unit III: Natural Phenomena

Reflection of light by curved surfaces; Images formed by spherical mirrors, centre of curvature, principal axis, principal focus, focal length, mirror formula(Derivation not

required), magnification.
Refraction; Laws of refraction, refractive index.
Refraction of light by spherical lens; Image formed by spherical lenses; Lens formula (Derivation not required); Magnification. Power of a lens.
Functioning of a lens in human eye, defects of vision and their corrections, applications of spherical mirrors and lenses.
Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life (excluding colour of the sun at sunrise and sunset).

Theme: How Things Work
Unit IV: Effects of Current

Electric current, potential difference and electric current. Ohm's law; Resistance, Resistivity, Factors on which the resistance of a conductor depends. Series combination of resistors, parallel combination of resistors and its applications in daily life. Heating effect of electric current and its applications in daily life. Electric power, Interrelation between P, V, I and R. Magnetic effects of current: Magnetic field, field lines, field due to a current carrying conductor, field due to current carrying coil or solenoid; Force on current carrying conductor, Fleming's Left Hand Rule, Direct current. Alternating current: frequency of AC. Advantage of AC over DC. Domestic electric circuits.

Theme: Natural Resources
Unit V: Natural Resources

Environment: Eco-system, Environmental problems, Ozone depletion, waste their solutions. Bio degradable and non-bio degradable substances.

Rationalised Portion (Addition/Deletion)
CBSE Science Syllabus (2022-23)

Unit/ Chapter	**Rationalised Portion (Addition/Deletion)**
Ch: 1. Chemical Reactions and Equations	No Deletion
Ch: 2. Acids, Bases and Salts	No Deletion
Ch: 3. Metals and Non-metals	No Deletion
Ch: 4. Carbon and its Compounds	No Deletion
Ch: 5 Periodic Classification (Full Chapter Deleted)	Need for classification, early attempts at classification of elements (Dobereiner's Triads, Newland's Law of Octaves, Mendeleev's Periodic Table), Modern periodic table, gradation in properties, valency, atomic number, metallic and non-metallic properties.
Ch: 6. Life Processes	No Deletion
Ch: 7. Control and Coordination	No Deletion
Ch: 8. How do Organisms Reproduce?	No Deletion
Ch: 9. Heredity and Evolution	Basic concepts of evolution: evolution; evolution and classification and evolution should not be equated with progress
Ch: 10. Light Reflection and Refraction	No Deletion
Ch: 11. Human Eye and Colourful World	Application of scattering in explaining colour change of the sun at sunrise and sunset.
Ch: 12. Electricity	No Deletion
Ch: 13. Magnetic Effects of Electric Current.	Electric Motor, Electromagnetic induction. Induced potential difference, Induced current. Fleming's Right Hand Rule, Electric Generator,
Ch: 14. Sources of Energy (Full Chapter Deleted)	Different forms of energy, conventional and non-conventional sources of energy: Fossil fuels, solar energy; biogas; wind, water and tidal energy;
Ch: 15. Our Environment	No Deletion
Ch: 16. Sustainable Management of Natural Resources (This chapter will not be assessed in the year-end examination. It needs to be prepared only for Internal Assessment.)	Conservation and judicious use of natural resources. Forest and wild life, coal and petroleum conservation. Examples of people's participation for conservation of natural resources. Big dams: advantages and limitations, alternatives, if any. Water harvesting. Sustainability of natural resources.

Science

(086)

Class X

Sample Question Paper

2022-23

Max. Marks: 80 **Time Allowed: 3 Hours**

General Instructions:

i. This question paper consists of 39 questions in 5 sections.

ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

iii. **Section A** consists of 20 objective type questions carrying 1 mark each.

iv. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.

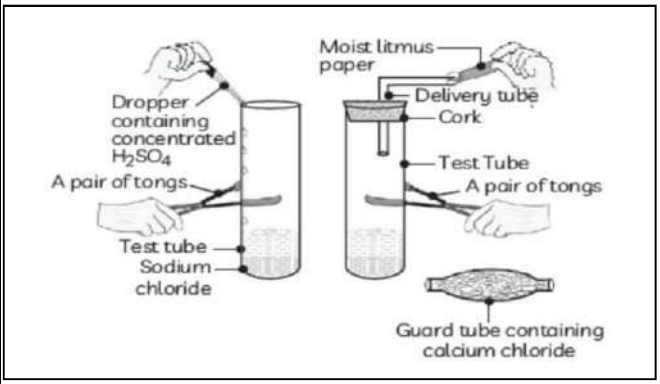
v. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words

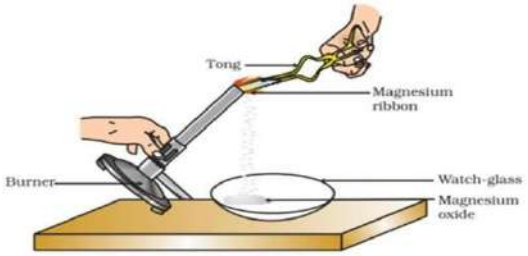
vi. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.

vii. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

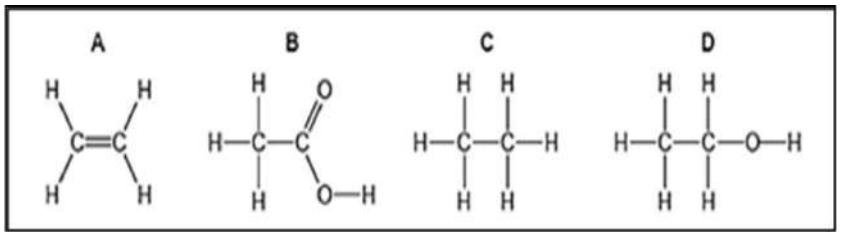
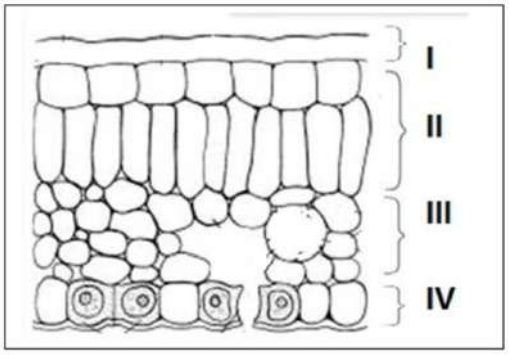
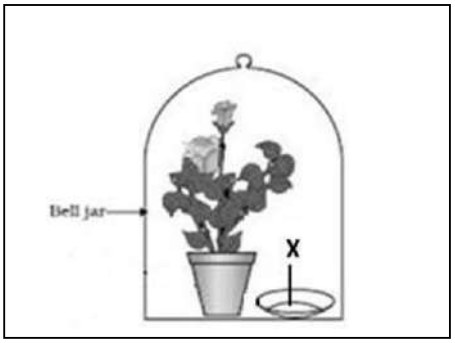
SECTION- A

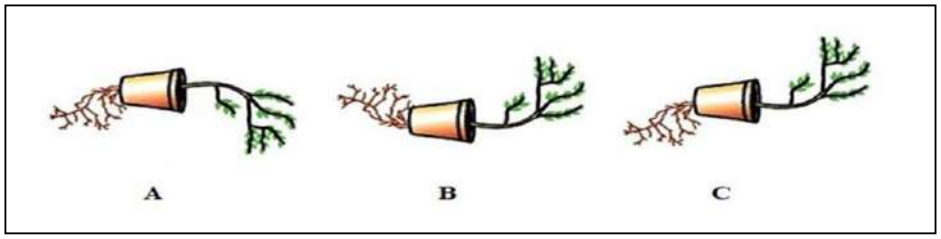
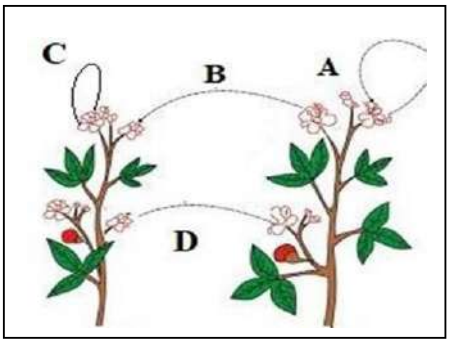
Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

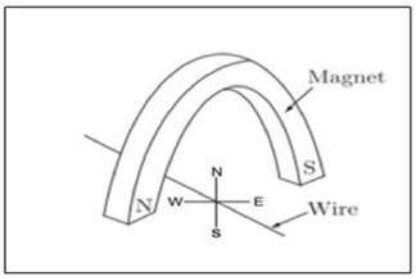
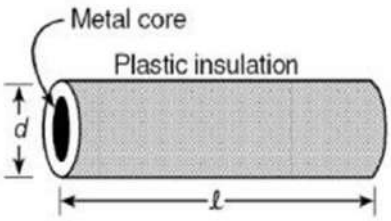
Q. No	Questions	Marks
1	Change in colour of the moist litmus paper in the given set up is due to  presence of acid presence of base presence of $H^+(aq)$ in the solution presence of Litmus which acts as an indicator i and ii (b) Only ii (c) Only iii (d) Only iv	1

<table>
<tr><td>2</td><td>In the redox reaction
$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$
(a) MnO_2 is reduced to $MnCl_2$& HCl is oxidized to H_2O
(b) MnO_2 is reduced to $MnCl_2$& HCl is oxidized to Cl_2
(c) MnO_2 is oxidized to $MnCl_2$ & HCl is reduced to Cl_2
(d) MnO_2 is oxidized to $MnCl_2$ & HCl is reduced to H_2O</td><td>1</td></tr>
<tr><td>3.</td><td> 

Which of the following is the correct observation of the reaction shown in the above setup?
(a) Brown powder of Magnesium oxide is formed.
(b) Colourless gas which turns lime water milky is evolved.
(c) Magnesium ribbon burns with brilliant white light.
Reddish brown gas with a smell of burning Sulphur has evolved.</td><td>1</td></tr>
<tr><td>4</td><td>With the reference to four gases CO_2, CO, Cl_2 and O_2, which oneof the options in the table is correct?
<table>
<tr><th>Option</th><th>Acidic Oxide</th><th>Used in Treatment of Water</th><th>Product of respiration</th><th>Product of incomplete combustion</th></tr>
<tr><td>a</td><td>CO</td><td>Cl2</td><td>O2</td><td>CO</td></tr>
<tr><td>b</td><td>CO2</td><td>Cl2</td><td>CO2</td><td>CO</td></tr>
<tr><td>c</td><td>CO2</td><td>O2</td><td>O2</td><td>CO2</td></tr>
<tr><td>d</td><td>CO2</td><td>O2</td><td>Co2</td><td>CO2</td></tr>
</table></td><td>1</td></tr>
<tr><td>5</td><td>On placing a copper coin in a test tube containing green ferrous sulphate solution, it will be observed that the ferrous sulphate solution
(a) turns blue, and a grey substance is deposited on the copper coin.
(b) turns colourless and a grey substance is deposited on the copper coin.
(c) turns colourless and a reddish–brown substance is deposited on the copper coin remains green with no change in the copper coin.</td><td>1</td></tr>
<tr><td>6</td><td>Anita added a drop each of diluted acetic acid and diluted hydrochloric acid on pH paper and compared the colors. Which of the following is the correct conclusion?
(a) pH of acetic acid is more than that of hydrochloric acid.
(b) pH of acetic acid is less than that of hydrochloric acid.
(c) Acetic acid dissociates completely in aqueous solution.
Acetic acid is a strong acid</td><td>1</td></tr>
</table>

7	The formulae of four organic compounds are shown below. Choose the correct option  (a) A and B are unsaturated hydrocarbons (b) C and D are saturated hydrocarbons (c) Addition of hydrogen in presence of catalyst changes A to C (d) Addition of potassium permanganate changes B to D	1
8	In the given transverse section of the leaf identify the layer of cells where maximum photosynthesis occurs.  (a) I, II (b) II, III (c) III, IV (d) I, IV	1
9	Observe the experimental setup shown below. Name the chemical indicated as 'X' that can absorb the gas which is evolved as a byproduct of respiration.  (a) NaOH (b) KOH (c) $Ca(OH)_2$ (d) K_2CO_3	1

10	If a tall pea plant is crossed with a pure dwarf pea plant then, what percentage of F1 andF2 generation respectively will be tall? (a) 25%, 25% (b) 50%, 50% (c) 75%,100% (d) 100%, 75%	1
11	Observe the three figures given below. Which of the following depicts tropic movements appropriately?  (a) B and C (b) A and C (c) B only (d) C only	1
12	The diagram shown below depicts pollination. Choose the options that will show a maximum variation in the offspring.  (a) A, B and C (b) B and D (c) B, C and D (d) A and C	1
13	A complete circuit is left on for several minutes, causing the connecting copper wire to become hot. As the temperature of the wire increases, the electrical resistance of the wire (a) decreases. (b) remains the same. (c) increases. (d) increases for some time and then decreases .	1

14	A copper wire is held between the poles of a magnet.  The current in the wire can be reversed. The pole of the magnet can also be changed over. In how many of the four directions shown can the force act on the wire? (a) 1 (b) 2 (c) 3 (d) 4	1
15	 Plastic insulation surrounds a wire having diameter ***d*** and length ***l*** as shown above. A decrease in the resistance of the wire would be produced by an increase in the (a) length l of the wire (b) diameter d of the wire (c) temperature of the wire (d) thickness of the plastic insulation	1
16	Which of the following pattern correctly describes the magnetic field around a long straight wire carrying current? (a) straight lines perpendicular to the wire. (b) straight lines parallel to the wire. (c) radial lines originating from the wire. (d) concentric circles centred around the wire.	1

Q. no 17 to 20 are Assertion - Reasoning based questions.

These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

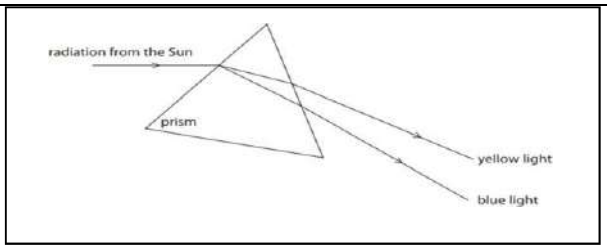
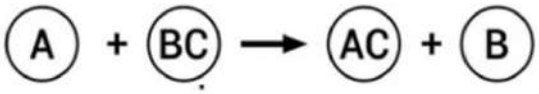
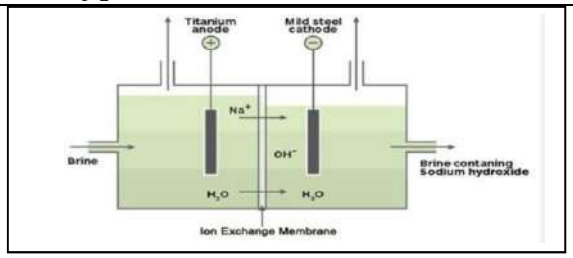
(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true and R is not the correct explanation of A

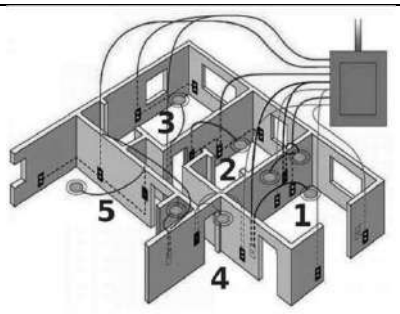
(c) A is true but R is false

(d) A is False but R is true

<table>
<tr><td>17</td><td>Assertion: Silver bromide decomposition is used in black and white photography.
Reason: Light provides energy for this exothermic reaction.</td><td>1</td></tr>
<tr><td>18</td><td>Assertion: Height in pea plants is controlled by efficiency of enzymes and is thus genetically controlled.
Reason: Cellular DNA is the information source for making proteins in the cell.</td><td>1</td></tr>
<tr><td>19</td><td>Assertion: Amphibians can tolerate mixing of oxygenated and deoxygenated blood.
Reason: Amphibians are animals with two chambered heart</td><td>1</td></tr>
<tr><td>20</td><td>Assertion: On freely suspending a current – carrying solenoid, it comes to rest in Geographical N-S direction.
Reason : One end of current carrying straight solenoid behaves as a North pole and the other end as a South pole, just like a bar magnet.</td><td>1</td></tr>
<tr><td colspan="3">SECTION B
Q. no. 21 to 26 are very short answer questions.</td></tr>
<tr><td>21</td><td>A clear solution of slaked lime is made by dissolving $Ca(OH)_2$ in an excess of water. This solution is left exposed to air. The solution slowly goes milky as a faint white precipitate forms. Explain why a faint white precipitate forms, support your response with the help of a chemical equation.
OR
Keerti added dilute Hydrochloric acid to four metals and recorded her observations as shown in the table given below:
<table><tr><th>Metal</th><th>Gas Evolved</th></tr><tr><td>Copper</td><td>Yes</td></tr><tr><td>Iron</td><td>Yes</td></tr><tr><td>Magnesium</td><td>No</td></tr><tr><td>Zinc</td><td>Yes</td></tr></table>Select the correct observation(s) and give chemical equation(s) of the reaction involved.</td><td>2</td></tr>
<tr><td>22</td><td>How is the mode of action in beating of the heart different from reflex actions?Give four examples.</td><td>2</td></tr>
<tr><td>23</td><td>Patients whose gall bladder are removed are recommended to eat less oily food. Why?</td><td>2</td></tr>
<tr><td>24</td><td>Name the substances other than water, that are reabsorbed during urine formation. What are the two parameters that decide the amount of water that is reabsorbed in the kidney?</td><td>2</td></tr>
</table>

25	 State the phenomena observed in the above diagram. Explain with reference to the diagram, which of the two lights mentioned above will have the higher wavelength? **OR** How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light? Draw the diagram.	2
26	A lot of waste is generated in neighborhood. However, almost all of it is biodegradable. What impact will it have on the environment or human health?	2
	SECTION - C Q.no. 27 to 33 are short answer questions.	
27	i)  ii)  Identify the types of reaction mentioned above in (i) and (ii). Give one example for each type in the form of a balanced chemical equation.	3
28	 (a) Identify the gasses evolved at the anode and cathode in the above experimental set up. (b) Name the process that occurs. Why is it called so? (c) Illustrate the reaction of the process with the help of a chemical equation.	
29	The leaves of a plant were covered with aluminium foil, how would it affect the physiology of the plant? **OR** How is lymph an important fluid involved in transportation? If lymphatic vessels get blocked, how would it affect the human body? Elaborate.	3

30	Rohit wants to have an erect image of an object using a converging mirror of focal length 40 cm. (a) Specify the range of distance where the object can be placed in front of the mirror. Justify. (b) Draw a ray diagram to show image formation in this case. State one use of the mirror based on the above kind of image formation.	3
31	(a) A lens of focal length 5 cm is being used by Debashree in the laboratory as a magnifying glass. Her least distance of distinct vision is 25 cm. (i) What is the magnification obtained by using the glass? (ii) She keeps a book at a distance 10 cm from her eyes and tries to read. She is unable to read. What is the reason for this? (b) Ravi kept a book at a distance of 10 cm from the eyes of his friend Hari. Hari is not able to read anything written in the book. Give reasons for this?	3
32	A student fixes a white sheet of paper on a drawing board. He places a bar magnet in the centre and sprinkles some iron filings uniformly around the bar magnet. Then he taps gently and observes that iron filings arrange themselves in a certain pattern. (a) Why do iron filings arrange themselves in a particular pattern? (b) Which physical quantity is indicated by the pattern of field lines around the bar magnet? (c) State any two properties of magnetic field lines. **OR** A compass needle is placed near a current carrying wire. State your observations for the following cases and give reasons for the same in each case- (a) Magnitude of electric current in wire is increased. (b) The compass needle is displaced away from the wire.	3
33	Why is damage to the ozone layer a cause for concern? What are its causes and what steps are being taken to limit this damage?	3
	SECTION-D Q.no. 34 to 36 are Long answer questions.	
34	Shristi heated Ethanol with a compound A in presence of a few drops of concentrated sulphuric acid and observed a sweet smelling compound B is formed. When B is treated with sodium hydroxide it gives back Ethanol and a compound C. (a) Identify A and C (b) Give one use each of compounds A and B.	5

	(c) Write the chemical reactions involved and name the reactions. **OR** (a) What is the role of concentrated Sulphuric acid when it is heated with Ethanol at 443 K. Give the reaction involved. (b) Reshu by mistake forgot to label the two test tubes containing Ethanol and Ethanoic acid. Suggest an experiment to identify the substances correctly? Illustrate the reactions with the help of chemical equations	
35	(a) Why is it not possible to reconstruct the whole organism from a fragment in complex multi cellular organisms? (b) Sexual maturation of reproductive tissues and organs are necessary link for reproduction. Elucidate. **OR** (a) How are variations useful for species if there is drastic alteration in the niches? (b) Explain how the uterus and placenta provide necessary conditions for proper growth and development of the embryo after implantation?	5
36	 The diagram above is a schematic diagram of a household circuit. The house shown in the above diagram has 5 usable spaces where electrical connections are made. For this house, the mains have a voltage of 220 V and the net current coming from the mains is 22A. (a) What is the mode of connection to all the spaces in the house from the mains? (b) The spaces 5 and 4 have the same resistance and spaces 3 and 2 have respective resistances of 20Ω and 30Ω. Space 1 has a resistance double that of space 5. What is the net resistance for space 5. (c) What is the current in space 3? What should be placed between the main connection and the rest of the house's electrical appliances to save them from accidental high electric current?	5

SECTION - E

Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.

37 (4)

Two students decided to investigate the effect of water and air on iron object under identical experimental conditions. They measured the mass of each object before placing it partially immersed in 10 ml of water. After a few days, the object were removed, dried and their masses were measured. The table shows their results.

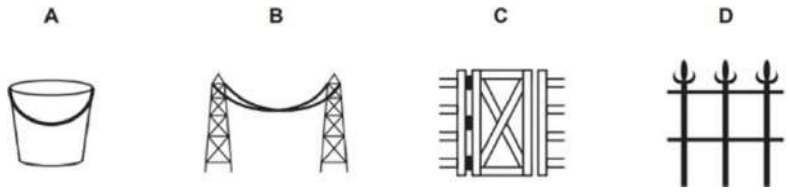
Student	Object	Mass of Object before Rusting in g	Mass of the coated object in g
A	Nail	3.0	3.15
B	Thin Plate	6.0	6.33

(a) What might be the reason for the varied observations of the two students?

(b) In another set up the students coated iron nails with zinc metal and noted that, iron nails coated with zinc prevents rusting. They also observed that zinc initially acts as a physical barrier, but an extra advantage of using zinc is that it continues to prevent rusting even if the layer of zinc is damaged. Name this process of rust prevention and give any two other methods to prevent rusting.

OR

(b) In which of the following applications of Iron, rusting will occur most? Support your answer with valid reason.



A - Iron Bucket electroplated with Zinc

B - Electricity cables having iron wires covered with aluminium

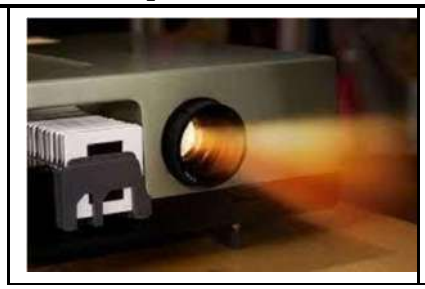
C - Iron hinges on a gate

D - Painted iron fence

38 (4)

Pooja has green eyes while her parents and brother have black eyes. Pooja's husband Ravi has black eyes while his mother has green eyes and father has black eyes.

(a) On the basis of the above given information, is the green eye colour a dominant or recessive trait? Justify your answer.

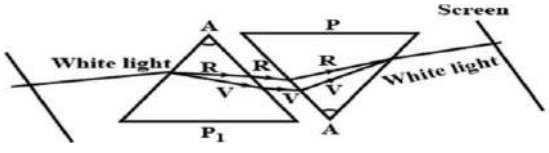
	(b) What is the possible genetic makeup of Pooja's brother's eye colour? (c) What is the probability that the offspring of Pooja and Ravi will have green eyes? Also, show the inheritance of eye colour in the offspring with the help of a suitable cross. **OR** (c) 50% of the offspring of Pooja's brother are green eyed. With help of crosss how this is possible.	
39	  The above images are that of a specialized slide projector. Slides are small transparencies mounted in sturdy frames ideally suited to magnification and projection, since they have a very high resolution and a high image quality. There is a tray where the slides are to be put into a particular orientation so that the viewers can see the enlarged erect images of the transparent slides. This means that the slides will have to be inserted upside down in the projector tray. To show her students the images of insects that she investigated in the lab, Mrs. Iyer brought a slide projector. Her slide projector produced a 500 times enlarged and inverted image of a slide on a screen 10 m away. (a) Based on the text and data given in the above paragraph, what kind of lens must the slide projector have? (b) If *v* is the symbol used for image distance and *u* for object distance then with one reason state what will be the sign for $^{v}/_{u}$ in the given case? (c) A slide projector has a convex lens with a focal length of 20 cm. The slide is placed upside down 21 cm from the lens. How far away should the screen be placed from the slide projector's lens so that the slide is in focus? **OR** (c)When a slide is placed 15 cm behind the lens in the projector, an image is formed 3 m in front of the lens. If the focal length of the lens is 14 cm, draw a ray diagram to show image formation. (not to scale)	4

SCIENCE (086)

CLASS X

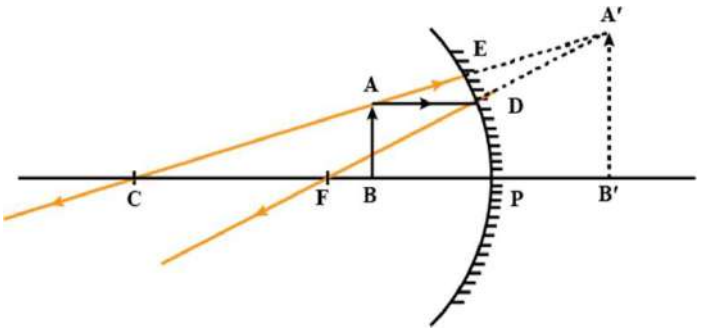
MARKING SCHEME (2022-23)

Q. No	Questions	Marks
	SECTION – A	
1	(c) Only iii	1
2.	(b) MnO_2 is reduced to $MnCl_2$ & HCl is oxidized to Cl_2	1
3.	(c) Magnesium ribbon burns with brilliant white light	1
4.	(b) CO_2, Cl_2, CO_2, CO	1
5.	(d) Ferrous sulphate solution remains green with no change in the copper coin.	1
6.	(a) Only i	1
7.	(c) Addition of hydrogen in presence of catalyst changes A to C	1
8.	(b) II,III	1
9.	(b)	1
10.	(d)	1
11.	(d) C only	1
12.	(b) B and D	1
13.	(c) increases	1
14.	(b) 2 (Either North or South)	1
15.	(b) diameter d of the wire	1
16.	(d) The field consists of concentric circles centred around the wire.	1
17.	(c) A is true but R is false	1
18.	(a) Both A and R are true and R is the correct explanation of A	1
19.	(c) A is true but R is false	1
20.	(a) Both A and R are true and R is the correct explanation of A	1
	SECTION – B	
21.	Calcium hydroxide reacts with Carbon dioxide present in the atmosphere to form Calcium carbonate which results in milkiness/white ppt / Formation of Calcium carbonate (1mark) $+ CO_2 \rightarrow CaCO_3 + H_2O$ (1mark) **OR** $Fe + HCl \rightarrow FeCl_2 / FeCl_3 + H_2$(1mark) (No deduction for	2

<table>
<tr><td></td><td>balancing/ states)$Zn + HCl \rightarrow ZnCl_2 + H_2$ - 1M</td><td></td></tr>
<tr><td>22.</td><td>
<table>
<tr><td>Beating of heart</td><td>Reflex actions</td></tr>
<tr><td>Involuntary actions are the actions which are not controlled by our will.</td><td>Reflex action are the sudden action in response to something.</td></tr>
<tr><td>They do not need any kind of stimulus to work.</td><td>They required stimulus for its action.</td></tr>
<tr><td>These actions are regulated by the brain.</td><td>These action are regulated by spinal cord.</td></tr>
<tr><td>They do not involve skeletal muscle</td><td>They do involve skeletal muscle</td></tr>
<tr><td>These actions are performed throughout one’s life</td><td>These actions are produced in response to an event of an emergency</td></tr>
<tr><td>This action may be quick or slow</td><td>Reflex action are always quick</td></tr>
</table>
Any four points (½ x4=2 marks)
</td><td>2</td></tr>
<tr><td>23.</td><td>Gallbladder stores bile which helps in emulsification of lipids (1mark).
In the absence of stored bile, emulsification of fats will be negligible/ affected/ less (1mark) and thus fat digestion will be slow. Hence there are such diet restrictions.</td><td>2</td></tr>
<tr><td>24.</td><td>Glucose, amino acids, salts (any 2, 1 mark each) and a major amount of water are selectively re-absorbed as the urine flows along the tube.
The amount of water reabsorbed depends on how much excess water there is in the body (0.5 marks), and on how much of dissolved waste there is to be excreted (0.5marks)</td><td>2</td></tr>
<tr><td>25.</td><td>Dispersion- The splitting of white light into seven colours on passing through a prism.(1 mark)
Velocity is directly proportional to wavelength given constant frequency. So yellow will have greater wavelength than blue as the velocity of yellow light is greater than blue.(0.5 + 0.5 mark)
OR
Angle of deflections of the two prisms need to be equal and opposite. While the first prism splits the light in the seven colours due to different angles of deflection, the second prism combines the spectrum along a single ray and the colours again combine to give white light as the emergent light. (1mark)
 

(1mark)</td><td>2</td></tr>
</table>

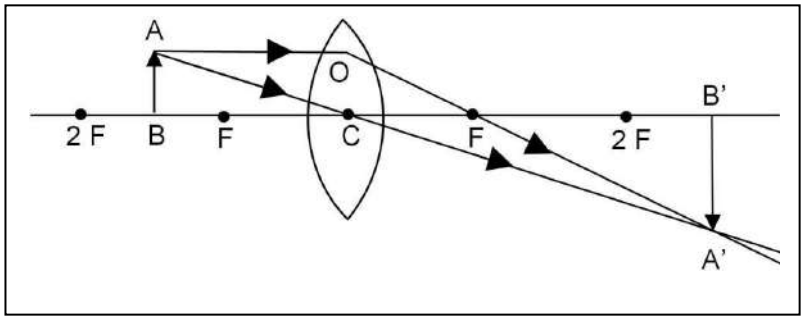
26.	Excess generation of biodegradable wastes can be harmful as - Its decomposition is a slow process leading to production of foul smell and gases. (1mark) It can be the breeding ground for germs that create unhygienic conditions. (1 mark)	2
	SECTION - C Q.no. 27 to 33 are short answer questions.	
27.	i) Displacement - ½ M • $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$ (1 mark) • $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$ • $Pb(s) + CuCl_2(aq) \rightarrow PbCl_2(aq) + Cu(s)$ (Any one of the reaction or other displacement reaction.) ii) Double displacement (½ mark) $Na_2SO_4(aq) + BaCl_2(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$ (1 mark) (Any one of the reaction or other double displacement reaction.)	3
28.	(a) Anode: Chlorine; Cathode: Hydrogen (b) Chlor alkali process as the products obtained are alkali, chlorine gas and hydrogen gas Electric current (c) $2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$	3
29.	No photosynthesis will occur so no glucose will be made. Also no respiration will take place as no Oxygen will be taken in. (1) No transpiration will occur so there would be no upward movement of water or minerals from the soil as there will be notranspirational pull. (1) Temperature regulation of leaf surface will be affected. (1) **OR** Lymph carries digested and absorbed fat from the intestine (1) and drains excess fluid from extracellular space back into the blood (1). Blockage of lymphatic system will lead to water retention and poor fat absorption in the body. (1- any one)	3

30.	(a) The object has to be placed at a distance between 0 - 40 cm. This is because image is virtual, erect and magnified when the object is placed between F and P. (1 mark) (b)  (1 mark) (c) Used as shaving mirror or used by dentists to get enlarged image of teeth(any one use) (1 mark)	3
31.	(a) Given. image distance = v = -25 cm. focal length = f = 5 cm. magnification = m = ? From lens formula. $\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{u} = \frac{1}{v} - \frac{1}{f}$ $\frac{1}{u} = \frac{1}{-25} - \frac{1}{5} = \frac{-1-5}{25} = \frac{-6}{25}$ Object distance $= u = \frac{-25}{6} cm.$ We know that $m = \frac{v}{u} = \frac{-25}{-25} \times 6 = 6$ (2 marks) (b) This is because the least distance of distinct vision is 25 cm. (1 mark)	3
32.	(a) When iron filings are placed in a magnetic field around a bar magnet, they behave like tiny magnets. The magnetic force experienced by these tiny magnets make them rotate and align themselves along the direction of field lines. (1 mark) (b)The physical property indicated by this arrangement is the magnetic field produced by the bar magnet. (1 mark) (c) Magnetic field lines never intersect, magnetic field lines are closed curves. (1mark) OR (a) The deflection in the compass needle increases as Magnetic field of the current carrying conductor is directly proportional to current flowing through it. (1.5marks)	3

	(b) The deflection in the needle decreases as the magnetic field is inversely proportional to the perpendicular distance from the wire. (1.5marks)	
33.	Damage to the ozone layer is a cause for concern because the ozone layer shields the surface of earth from harmful UV radiations from the sun which cause skin cancer in human beings. Synthetic chemicals like chlorofluorocarbons (CFCs) which are used as refrigerants and in the fire - extinguishers are the main reason for the depletion of the ozone layer. Steps taken to limit this damage - Many developing and developed countries have signed and are obeying the directions of UNEP (United Nations Environment Programme) to freeze or limit the production and usage of CFCs at 1986 levels. (1 x 3 = 3 marks)	3
	SECTION –D Q.no. 34 to 36 are Long answer questions.	
34.	(a) A – Ethanoic acid/ Or any other carboxylic acid , C- Sodium salt of ethanoic acid/ any other carboxylic acid/ sodium ethanoate (½ + ½ mark) (b) Use of A- dil solution used as vinegar in cooking/ preservative in pickles(1mark) Use of B – making perfumes, flavoring agent (1 mark) Conc H_2SO_4 (c) $CH_3COOH + C_2H_5OH$ ---- > $CH_3COOC_2H_5 + H_2O$ (1mark) $CH_3COOC_2H_5 + NaOH$ ---------- > $CH_3COONa + C_2H_5OH$ (1mark) **OR** (a) Sulphuric acid acts as dehydrating agent (1mark) Conc H_2SO_4, 443K C_2H_5OH ——————————> $C_2H_4 + H_2O$ (1mark) (b) By reaction with sodium carbonate/ bi carbonate 1M with the samples, ethanol will not react whereas ethanoic acid gives brisk effervescence (1mark) $2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + H_2O + CO_2$ **OR** $CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + H_2O + CO_2$ (1 mark)	5

35	(a) The reason is that many multi-cellular organisms are not simply a random collection of cells. Specialised cells are organised as tissues, and tissues are organised into organs, which then have to be placed at definite positions in the body. Therefore, cell-by-cell division would be impractical.(2 marks) (b) Sexual maturation of reproductive tissues is a necessary link for reproduction because of the need for specialised cell called germ-cells to participate in sexual reproduction. The body of the individual organism has to grow to its adult size, the rate of general body growth begins to slow down, reproductive tissues begin to mature. (1½ marks) A whole new set of changes in the appearance of the body takes place like change in body proportions, new features appear. This period during adolescence is called puberty. There are also changes taking place that are different between boys and girls. In girls, breast size begins to increase, with darkening of the skin of the nipples at the tips of the breasts. Also, girls begin to menstruate at around this time. Boys begin to have new thick hair growth on the face and their voices begin to crack.(1½ marks) **OR** (a) If the niche were drastically altered, the population could be wiped out. However, if some variations were to be present in a few individuals in these populations, there would be some chance for them to survive. Variation is thus useful for the survival of species over time. (2 marks) (b) • The lining of the uterus thickens and is richly supplied with blood to nourish the growing embryo. (½ mark) • The embryo gets nutrition from the mother's blood with the help of placenta. It is embedded in the uterine wall. (½ mark) • It contains villi on the embryo's side of the tissue. On the mother's side are blood spaces, which surround the villi. (½ mark) • This provides a large surface area for glucose and oxygen to pass from the mother to the embryo. The developing embryo will also generate waste substances which can be removed by transferring them into the mother's blood through the placenta. (1 mark)	5

	The child is born as a result of rhythmic contractions of the muscles in the uterus. (½ mark)	
36	(a) All spaces are connected in parallel. (1mark) (b) Let Resistance of Space 5 and 4 be R ohms respectively (2marks) Resistance of Space 1 = 2 R ohms Resistance of Space 2 = 30 ohms Resistance of Space 3 = 20 ohms Current = 22 A V= 220 V Total Resistance= V/I $\frac{1}{R1}+\frac{1}{R2}+\frac{1}{R3}+\frac{1}{R4}+\frac{1}{R5}=\frac{1}{Req}$ $\frac{1}{2R}+\frac{1}{20}+\frac{1}{30}+\frac{1}{R}+\frac{1}{R}=\frac{1}{Req}$ $\frac{30+2R+3R+60+60}{60\,R}=\frac{1}{Req}$ $\frac{150+5R}{60\,R}=\frac{1}{R\,eq}$ Req = $\frac{60\,R}{150+5R}$ 60R = 10(150 + 5R) 60R = 1500 + 50R 10R = 1500 or R= 150 ohm	5
	SECTION – E Q.no. 37 to 39 are case – based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.	
37	a) Rusting occurs in both A and B so there is an increase in mass. (1 mark) As the surface area of B is more, extent of rusting is more (1 mark) b) Galvanization -(1 mark) Oiling/ greasing/ painting/ alloying/ chromium plating or any other (any two ½ mark each) – (1 mark) **OR** b) C - Iron hinges on a gate - Iron is in contact with both atmospheric oxygen and moisture/water vapour. (2 marks)	4

38	a. Yes, green eye colour is recessive (½ mark) as it will express only in homozygous condition (½ mark) b. BB, Bb (1 mark) c. bb*Bb (0.5mark) Genetic cross - (1 mark) 50% of the off springs can have green eye colour (0.5) **OR** c. Brother is heterozygous(Bb) and wife is green(bb) - (1)Wife bb*Bb brother 50% of the off springs can have green eye colour as per the crossshown. (1 mark)	4
39	(a) Convex Lens (1mark) (b) Negative as the image is real and inverted. (1mark) (c) 1/f= 1/v- 1/u 1/20 = 1/v- 1/-20 1/v = 1/20 - 1/21 = (21 - 20)/420 = 1/420 v= 420 cm (2 marks) **OR** (c)  (2 marks)	4

	B	b
b	Bb	bb
b	Bb	bb

	B	b
b	Bb	bb
b	Bb	bb

Science (086)
Class X
Sample Question Paper – 1 (2022-23)

Max. Marks:80 **Time Allowed:3 Hours**

General Instructions:

(i) This question paper consists of 39 questions in 5 sections.

(ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

(iii) **Section A** consists of 20 objective type questions carrying 1 mark each.

(iv) **Section B** consists of 6 very short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.

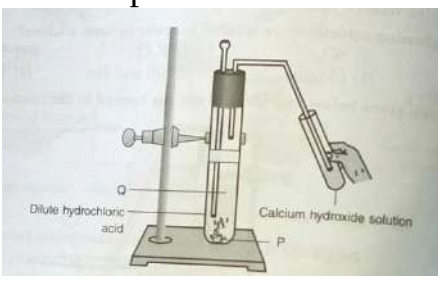
(v) **Section C** consists of 7 short Answer type questions carrying 03 marks each. Answer to these questions should in the range of 50 to 80 words.

(vi) **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.

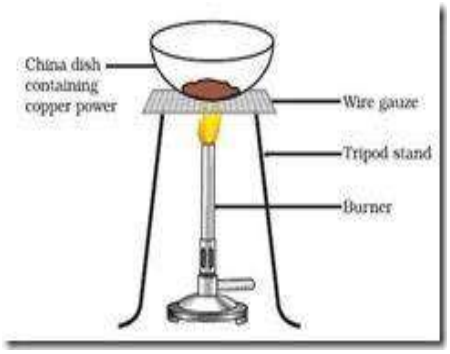
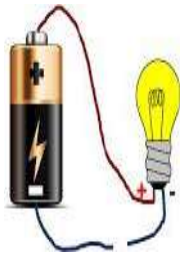
(vii) **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with subparts.

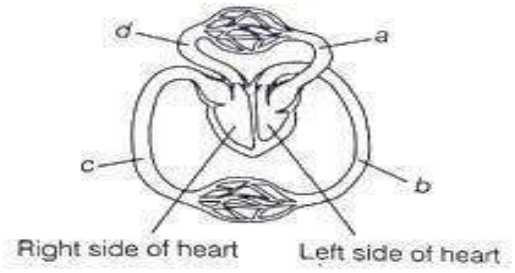
Section-A

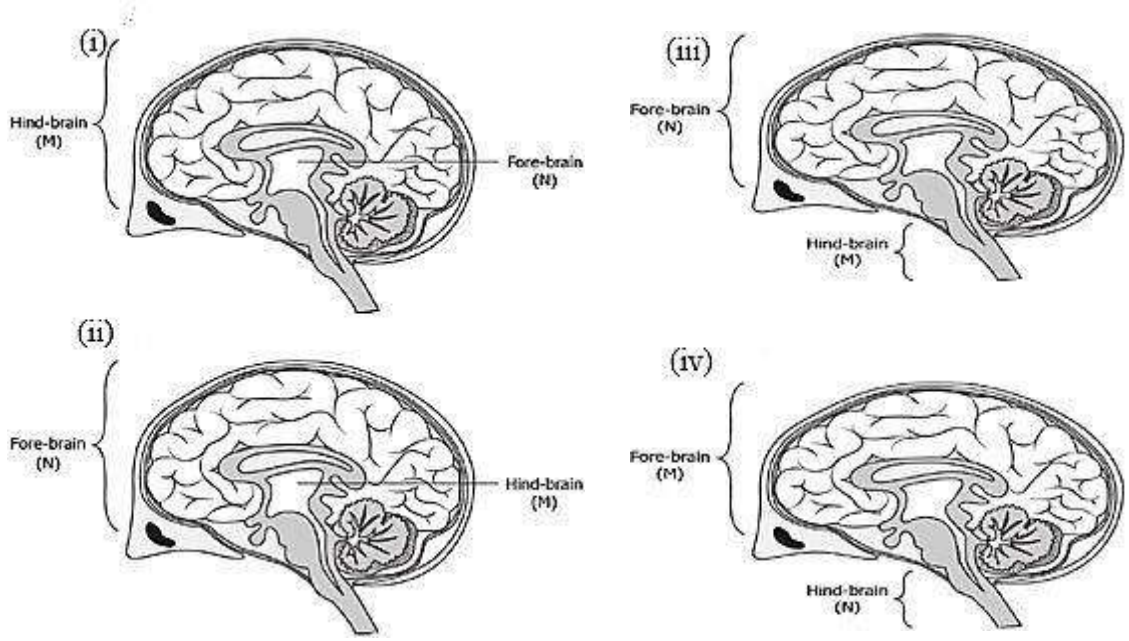
Select and write one most appropriate option out of the four options given for each of the questions 1-20

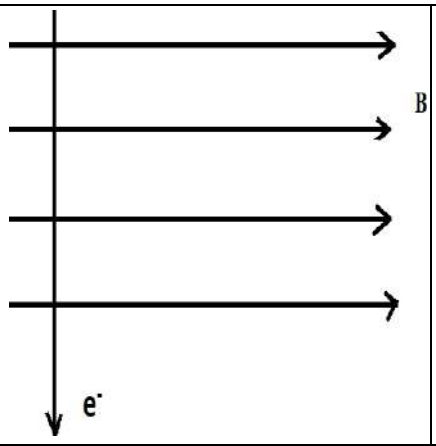
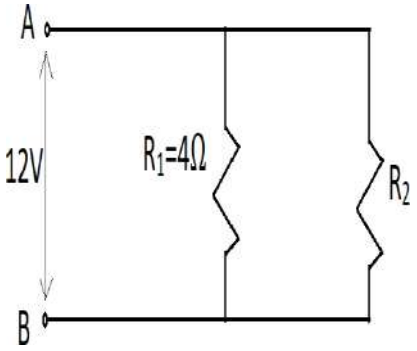
Q.No.	Questions	Marks
1.	Study the experimental set up shown in the given figure and choose the correct option from the following: 	1
2.	In the following reaction:	1

	P	Q	Change observed in Calcium hydroxide solution
a.	K_2CO_3	Cl_2 gas	No change
b.	$KHCO_3$	CO_2gas	No change
c.	$KHCO_3$	H_2 gas	Turns milky
d.	K_2CO_3	CO_2gas	Turns milky

	$Pb_3O_4 + 8HCl \rightarrow 3PbCl_2 + Cl_2 + 4H_2O$ a. Pb_3O_4 is reduced to $PbCl_2$ & HCl is oxidized to H_2O b. Pb_3O_4 is reduced to $PbCl_2$ & HCl is oxidized to Cl_2 c. Pb_3O_4 is oxidized to $PbCl_2$ & HCl is reduced to Cl_2 d. Pb_3O_4 is oxidized to $PbCl_2$ & HCl is reduced to H_2O.	
3.	Copper powder is heated in a China dish as shown in the figure. Which of the followings is not correct about this reaction? a. A black colour copper (II) oxide is formed on the surface of the copper b. It is an example of combination reaction c. It is an example of redox reaction d. No reaction takes place as copper is less reactive. 	1
4.	Which of the given options correctly represents the type of acid or base from which Sodium carbonate is formed? OPTION / ACID / BASE a / Strong / Strong b / Strong / Weak c / Weak / Strong d / Weak / Weak	1
5.	Given below are reactions involving metals P, Q, R and S and their salt solutions in water. Metal P salt solution + Q → Metal Q salt solution + P Metal Q salt solution + R → Metal R salt solution + Q Metal S salt solution + Q → Metal Q salt solution + S Metal P salt solution + S → No reaction Which metal is most reactive? a. P b. Q c. R d. S	1
6.	Observe the experimental set up carefully: You are provided with four (4) types of metallic wires i.e., silver wire, copper wire, lead wire and iron wire. Which type of metallic wire would you like to put in the circuit between the gap of two terminals, so that the circuit will show maximum conductivity? 	1

	a. Lead c. Silver	b. Iron d. Copper	
7.	Identify the correct representation of reaction occurring during Chlor-alkali process. a. $2NaCl(l) + 2H_2O(l) \rightarrow 2NaOH(l) + Cl_2(g) + H_2(g)$ b. $2NaCl(aq) + 2H_2O(aq) \rightarrow 2NaOH(aq) + Cl_2(l) + H_2(aq)$ c. $2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(aq) + H_2(aq)$ d. $2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$		1
8.	The diagram represents the part of human circulatory system. Where is the blood flow highest?  a. (d) and (b) b. Only d c. (a) and (c) d. Only (b)		1
9.	Find the correct answers about glomerular filtrate: 1. Formed continuously through ultrafiltration of blood 2. Lipid free fluid collects in the lumen of Bowman's capsule 3. Protein free fluid collects in the lumen of Bowman's capsule 4. Formed by the process of selective reabsorption a. 1, 2 and 3 is correct b. 1and 2 is correct c. 2 and 4 is correct d. 1 and 3 is correct		1
10.	In peas, a pure tall (TT) is crossed with a pure short plant (tt). The ratio of pure tall plants to pure short plants in F2 generation is: a. 1:3 b. 3:1 c. 1:1 d. 2:1		1
11.	Which option illustrates the location of the center that controls the feelings associated with hunger (M) and the center that allows a person to walk in a straight line (N)?		1

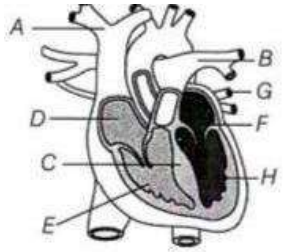
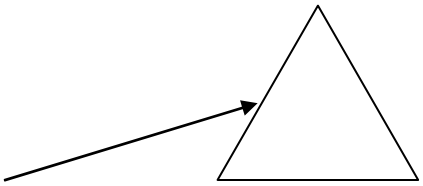
	 a. (i) b. (ii) c. (iii) d. (iv)	
12.	The number of chromosomes in both parents and offspring of a particular species remains constant because: a. Chromosomes get doubled after zygote formation b. Chromosomes get doubled after gamete formation c. Chromosomes get halved during gamete formation d. Chromosomes get halved after gamete formation	1
13.	The resistivity of a conductor of length „l" and thickness „A" is $8.0\ x\ 10^{-6}\ \Omega m$. It is pulled to double of its length. Which of the following will be its new resistivity? a. $4.0\ x\ 10^{-6}\ \Omega m$. b. $8.0\ x\ 10^{-6}\ \Omega m$. c. $1.6\ x\ 10^{-5}\ \Omega m$. d. $2.0\ x\ 10^{-6}\ \Omega m$.	1

14.	A beam of electrons is moving through a uniform magnetic field as shown in the diagram. In which direction a force will act on it? a. Vertically upward to the plane of the paper. b. To the right side. c. Vertically downward to the plane of the paper. d. In the downward direction.		1
15.	A student has three resistors 2Ω, 3Ω and 5Ω. She has to put one of them in place of R_2 so that a current of 9A exactly will flow in the circuit. Which one is to be used in place of R_2? a. 2Ω b. 3Ω c. 5Ω d. None of the above.		1
16.	The nature of the magnetic field produced by a bar magnet resembles to- a. The magnetic field produced by a straight current carrying conductor. b. The magnetic field produced by a circular coil current carrying conductor. c. The magnetic field produced by a current carrying solenoid. d. None of the above		1

Q. no. 17 to 20 are Assertion -Reasoning based questions.
These consist of two statements -Assertion (A) and Reason(R). Answer these questions selecting the appropriate option given below:

a. **Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'.**
b. **Both 'A' and 'R' are true and 'R' is not the correct explanation of 'A'.**
c. **'A' is true but 'R' is false.**
d. **'A' is false but 'R' is true.**

17.	**Assertion (A):** Photosynthesis is considered as an endothermic reaction. **Reason(R):** Energy gets released in the process of photosynthesis.	1
18.	**Assertion (A):** Female produces two types of gametes. **Reason(R):** Female has two X chromosomes as sex chromosome in germ cell.	1
19.	**Assertion:** The movement of water and dissolved salts in xylem is always upwards.	1

	Reason: The upward movement of water is due to low pressure created by transpiration.	
20.	**Assertion (A):** A current carrying conductor is placed in a magnetic field experiences a force on it. **Reason(R):** This is due to the force of attraction of the current carrying conductor.	1
	Section-B **Q no. 21 to 26 are very short answer questions.**	
21.	A compound X of sodium is used as an antacid and it decomposes on heating strongly to produce carbon dioxide gas. a. Name the compound X and give its chemical formula. b. Write balanced chemical equation to represent the decomposition of X. **OR** A student detected the pH of four unknown solutions A, B, C and D as follows: 11, 5, 7 and 2. Predict the nature of these solutions.	2
22.	A person accidentally kept his hand upon a sharp nail and immediately took his hand away. Draw a flowchart showing the pathway of nerve impulse for the above incident coordinated with your body.	2
23.	a. Identify the „part B" in the given diagram of human heart. b. Mention its role in the circulatory system. 	2
24.	Two green plants are kept separately in oxygen-free containers, one (Plant A) in the dark and the other (Plant B) in continuous light. a. Which plant will live longer? Give reason. b. State the unique feature of photosynthesis seen in case of desert plants.	2
25.	 A prism is placed on the table & a narrow beam of white light is incident on it as shown in the Figure. a. Complete the diagram with the emergent ray(s).	2

	b. Also write the cause of this phenomenon. **OR** Explain why don't we get the spectrum of light when white light passes through a parallel glass slab, with a labelled diagram.	
26.	a. We do not clean ponds or lakes but an aquarium needs to be cleaned regularly. Explain. b. „Energy flow in a food chain is unidirectional". Justify your answer.	2
	Section-C **Q no 27 to 33 are short answers questions.**	
27.	Explain in detail the role of pancreatic juice in the process of digestion of different components of food. **OR** a. Being devoid of enzymes, still bile juice plays a very important role in the process of digestion. Give reason. b. Name the site of secretion and storage of bile juice.	3
28.	Identify the type of reaction and also write a balanced chemical equation for each of the following reactions. a. A reaction in which the reaction mixture becomes warm. b. A reaction in which an insoluble substance is formed.	3
29.	The compound X and aluminum are used to join railway tracks. a. Identify the compound X. b. Name the reaction. c. Write down the reaction in this case.	3
30.	The absolute refractive indices of two media X and Y are 1.44 and 1.71 respectively. a. Calculate the relative refractive index of the medium Y with respect to X? b. What is the speed of light in medium Y? c. The value of absolute R.I is always greater than 1. Why?	3
31.	The near point of person recedes away from 25cm to 80cm. a. What is the kind of eye defect is he suffering from? b. Draw the corrective ray diagram for this eye with labelling.	3
32.	a. Represent the magnetic field produced by a current carrying straight conductor in a diagram. b. Name and state the rule to find out the direction of magnetic field	3

around a straight conductor carrying current.

OR

a. Draw the magnetic field lines produced by a current carrying solenoid with its correct poles.
b. Conclude the nature of the magnetic field produced inside this current carrying solenoid with reason.

33. a. If 400J of energy is available to primary consumer, what amount of energy will be available for tertiary consumer? 3

b. Show giving an example for the above food chain with four trophic levels through a flow chart.

c. State the 10% law associated with flow of energy on trophic levels of organisms.

Section-D

Q. no. 34 to 36 are long answer questions.

34. The formula of four organic compounds are given below: 5

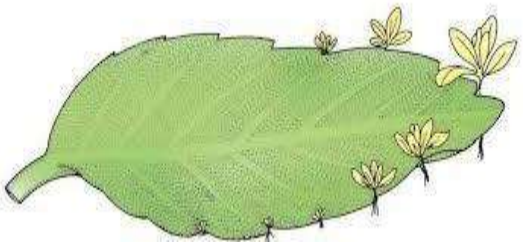
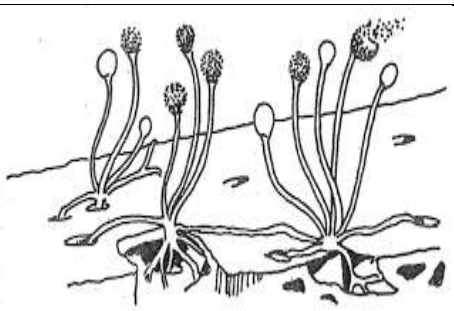
A	B	C	D
C_2H_4	CH_3COOH	C_2H_5OH	C_2H_6

a. Which one of these compounds A, B, C or D is a saturated hydrocarbon?
b. Identify the organic acid and give its structural formula.
c. Which of the above compounds, when heated at 443K in the presence of concentrated H_2SO_4 forms ethene as the major product? What is the role played by conc. H_2SO_4 in this reaction? Also write the chemical equation involved.
d. Write the chemical equation for the reaction between B and C 443K in the presence of concentrated H_2SO_4. Name the major product formed in this case.

OR

a. Define isomerism. Draw all the possible isomers of Butane.
b. "A compound X on combustion gives a yellow flame with lots of smoke." What information do you draw from this statement?
c. State the role of alkaline $KMnO_4$ in the reaction involving conversion of an alcohol to its corresponding carboxylic acid?

35. a. Identify the organisms A and B and mention the mode of asexual reproduction executed by them. 5

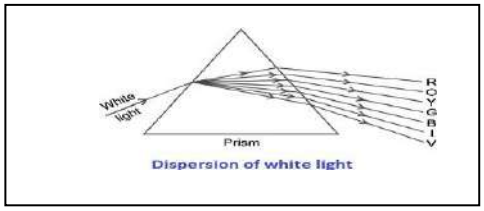
	 A  B b. An organism will be benefitted if it reproduces through spores. Give reason. c. Mention two asexual methods by which hydra can reproduce. Explain any one method. **OR** a. Suggest any three contraceptive methods to control the size of human population. State the basic principle involved in this b. Mention the changes that the uterus undergoes, i. To receive the zygote ii. If zygote is not formed	
36.	a. How the gadgets are connected in a house wiring system? b. Write any two advantages of such combination. c. Explain the function of the safety device used in house wiring system which works on the principle of heating effect of electric current.	5
	Section-E **Q. no. 37 to 39 are case based/data-based questions with 2 to 3 short subparts. Internal choice is provided in one of these sub-parts.**	
37.	The gradual eating up of metals and their conversion into their oxides, carbonates or sulphides is called corrosion. In case of iron metals, it is known as rusting. a. Write two conditions required for rusting. b. Write the chemical formula of rust. c. Rusting can also be called a redox reaction. Justify your answer. **OR** c. What happens when a silver article is exposed to air for a long time. Also write the balanced chemical equation in this case.	4
38.	A blue colour flower plant denoted by BB is cross bred with that of white	4

	colour flower plant denoted by bb. a. State the colour of flower you would expect in their F_1 generation. b. What must be the percentage of white flower plants in F_2 generation if flowers of F_1 plants are self-pollinated ? Show with the help of a cross. c. State the expected ratio of the genotypes BB and Bb in the F_2 progeny. **OR** c. Predict the phenotypic ratio of the F_2 generation.	
39.	When light goes from one optical medium to another optical medium its speed changes. Due to this change in speed, it bends either towards the normal or away from the normal depending on the optical density of the 2^{nd} medium. This is called refraction of light. When the light ray bends away from the normal its speed increases and when it bends towards the normal its speed decreases. a. Name the phenomenon of light responsible for the bending of a pencil in water. b. What change will be in the speed of light when it goes from diamond to glass medium? c. In a lens, the height of the object and its real image are 10cm and 5cm respectably. Find its magnification. **OR** c. How does a star twinkle, explain with the ray diagram.	4

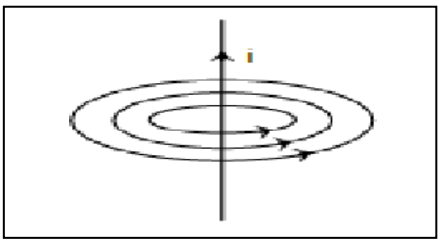
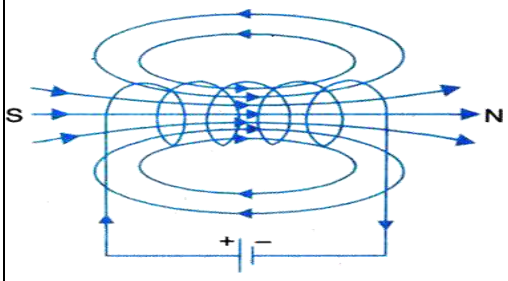
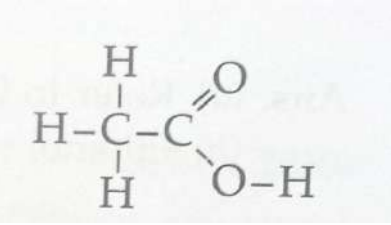
SCIENCE (086)
CLASS X
Sample Paper - 1 (2022-23)

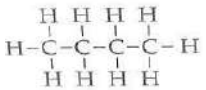
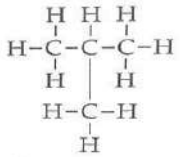
Marking Scheme.

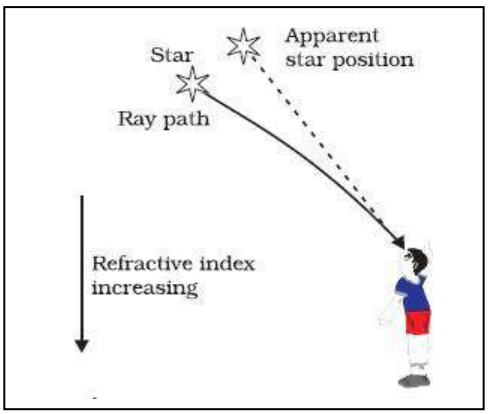
Q. No.	Key words	Value points
1.	d	1
2.	b	1
3.	d	1
4.	c	1
5.	c	1
6.	d	1
7.	d	1
8.	d. only (b)	1
9.	d. 1 and 3 is correct	1
10.	c. 1:1	1
11.	d. iv	1
12.	c. chromosome no. is halved during gamete formation	1
13.	$b. 8.0\ x\ 10^{-6}\ \Omega m.$	1
14.	c. Vertically downward to the plane of the paper.	1
15.	a.2Ω	1
16.	c. The magnetic field produced by a current carrying solenoid.	1
17.	c. A is true but R is false	1
18.	d. A is false but R is true	1
19.	a. Both A and R are true and R is the correct explanation of A	1
20.	c. Assertion (A) is true but Reason(R) is false.	1

21.	a. Baking soda, $NaHCO_3$ b. $2\ NaHCO_3 + \Delta \rightarrow Na_2CO_3 + CO_2 + H_2O$ **OR** A-11- Strong base B-5- Weak acid C-7- Neutral solution D-2- Strong acid	1 1 0.5 0.5 0.5 0.5
22.	receptor (skin) ⟶ sensory neuron⟶spinal cord⟶ motor neuron⟶ effector (muscle)	0.5 x 4
23.	a. part-B- Pulmonary Artery b. carries deoxygenated blood from right ventricle to lungs	1 1
24.	a. Plant B kept in continuous light reason- it will be able to produce oxygen required for its respiration by the process of photosynthesis b. desert plants take up carbon dioxide at night and prepare an intermediate which is acted upon by the energy absorbed by the chlorophyll during the day	0.5 0.5 0.5 0.5
25.	a.  Dispersion of white light b. Different colours of white light travel with different speed through the glass prism. **OR** Because a parallel glass slab is a combination of two glass prisms. One is erect and the other one is an inverted one. So, the erect prism splits the colours whereas the inverted one re-unites all the colours again to form white light.	1 1 1 1
26.	a. As ponds and lakes acts as natural ecosystem consisting of microorganisms (decomposers) that break down dead remains and waste products of organisms. But in aquarium, due to lack of decomposers we have to regularly clean it. b. The energy that is captured by the autotrophs does not revert back to the solar input and the energy which passes to the herbivores does not come back to autotrophs. It is no longer available to previous trophic level.	1 1

27.	a. The pancreas secretes pancreatic juice which contains enzymes like amylase, trypsin, lipase that helps in the digestion of carbohydrates, proteins and fats. **OR** a. Bile juice acts on the large fat globules and converts them into smaller fat globules or helps in emulsification of fats b. Site of secretion- liver, storage- gall bladder	0.5 x 6 1 1+1
28.	a. Exothermic reaction, $CaO + H_2O \rightarrow Ca(OH)_2$ (Or any relevant balanced chemical equation) b. Precipitation reaction, $AgNO_3 + NaCl \rightarrow AgCl (\downarrow) + NaNO_3$ (Or, any other relevant balanced chemical equation)	0.5+1 0.5+1
29.	a. Ferric oxide - Fe_2O_3 b. Thermite reaction (highly exothermic reaction) $Fe_2O_3 + 2Al \rightarrow 2Fe + Al_2O_3 + Heat$	1 1 1
30.	a. $n_{yx} = \frac{n_y}{n_x} = \frac{1.71}{1.44} = 1.18$ b. $n_y = \frac{c}{v_y}$ $\Rightarrow v_y = \frac{c}{n_y} = \frac{3x10^8}{1.71} = 1.75x10^8 m/s$ c. because the numerator is the value of speed of light 'C=$3x10^8 m/s$' i	1 1 1
31	a. Hypermetropia. b. Correct ray diagram (page no-190. 11.3(C)	1 2

32.	a. B α I $B\alpha\frac{1}{R}$  b.Right hand thumb rule Correct statement **OR** **a.** With proper polarity using clock rule.  **b.** Strong and uniform because the field lines are parallel and equidistant from each other.	2 1 2 1
33.	a. 4 J of energy will be available to tertiary consumer. b. producer (plants) → grasshopper → frog → snake c. 10 % LAW OF ENERGY FLOW- according to this law during the transfer of organic food from one trophic level to the next only about 10% of the organic matter is stored as flesh and can be made available to the next trophic level, rest 90% of energy is dissipated to the environment in form of heat energy	1 1 1
34.	a. D (C_2H_6)is a saturated hydrocarbon b. B (CH_3COOH) is the organic acid Its structural formula is:  c. (C_2H_5OH) Conc. H_2SO_4 acts as a dehydrating agent in this reaction.	0.5 0.5 0.5 0.5 0.5 1

	$C_2H_5OH \xrightarrow[443\ K]{\text{hot conc. } H_2SO_4} C_2H_4 + H_2O$ Ethanol — Ethene	1
	c. $CH_3COOH + C_2H_5OH \xrightarrow{\text{conc. } H_2SO_4} CH_3COOC_2H_5 + H_2O$ Ethanoic acid — Ethanol — Ethyl ethanoate The major product formed in this case Ester(Ethyl acetate/ethyl ethanoate)	0.5
	OR	
	a. Two or more compounds having same molecular formula but different structural formula is called isomers and the phenomenon is called isomerism.	1
	Two isomers of butane are:	1+1
	 Butane  2-Methyl propane	1 1
	b. X is an unsaturated hydrocarbon It acts as an oxidizing agent.	
35.	a. Organism A is Bryophyllum, mode of asexual reproduction is vegetative propagation through leaves .Organism B is Rhizopus (or bread mould), mode- Sporeformation	0.5 + 0.5
	b. Pores are highly durable and can germinate even after years of dormancy. Spores are covered with thick walls that protect them until they come in contact with the moist surface. (Any one)	0.5+ 0.5
	c. Two asexual methods are budding and regeneration any one explanation.	1
	Budding- a bud develops as an outgrowth due to repeated cell division at a specific site. These buds develop into tiny individuals, mature and detach from the parent to become new individuals .	0.5 +0.5
	regeneration – Specialized cells divide to form large number of cells that undergo changes to become various cell types and tissues	1
	OR	
	a. any three methods with principle	
	b. i. lining of uterus becomes thick and spongy to nourish embryo ii. lining breaks slowly and comes out through the vagina as blood and mucous known as menstrual cycle	½× 6 1 + 1
36.	a. in parallel combination b. all get equal voltage and can be used independently. c. explanation of the function of fuse wire	1 1+1 2

37.	a. Presence of air (oxygen) and moisture (water). b. Fe_2O_3. x H_2O c. Rusting can also be called a redox reaction. Because here iron (Fe) gets oxidised to Iron oxide (Fe^{3+}). And the oxygen and water present in the air gets reduced. **OR** c. It forms a black coloured coating of silver sulphide (Ag_2S) over themetal. $2Ag + H_2S \rightarrow Ag_2S + H_2$	1 1 1+1 1+1
38.	a. In F1 generation all the flowers of plant will be blue coloured (Bb) b. 25 % is the chances for white flowers in F2 generation. c. Cross to be made Genotypic ratio of BB:Bb in F2 progeny is 1:2 **OR** c. Blue: White =3:1	1 1 1+1 1+1
39.	a. Refraction b. speed of light increases. c. $m = \frac{h_i}{h_o} = \frac{-5cm}{10cm} = -0.5$ **OR** c. Atmospheric refraction with proper explanation  	1 1 1+1 1+1

Science (086)

Class X

Sample Question Paper - 2 (2022-23)

Max. Marks: 80 **Time Allowed: 3 Hours**

General Instructions:

i. This question paper consists of 39 questions in 5 sections.

ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

iii. Section A consists of 20 objective type questions carrying 1 mark each.

iv. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.

v. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words

vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.

vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

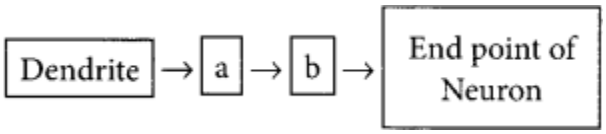
SECTION - A

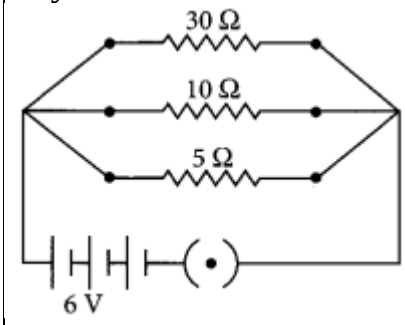
Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

Q.No.	Question	Marks
Q1.	What happens when a solution of an acid is mixed with a solution of a base in a test tube? (i) Temperature of the solution decreases (ii) Temperature of the solution increases (iii) Temperature of the solution remains the same (iv) Salt formation takes place (a) (i) and (iv) (b) (i) and (iii) (c) (ii) only (d) (ii) and (iv)	1
Q2.	Which of the following statements about the given reaction are correct? $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O4\ (s) + 4H_2\ (g)$ (i) Iron metal is getting oxidized. (ii) Water is getting reduced. (iii) Water is acting as reducing agent. (iv)Water is acting as oxidizing agent. (a) (i), (ii) & (iii) (b) (iii) & (iv) (c) (i), (ii) & (iv) (d) (ii) & (iv)	1
Q3.	Magnesium ribbon is rubbed before burning because it has a coating of (a) basic magnesium carbonate (b) basic magnesium oxide (c) basic magnesium sulphide (d) basic magnesium chloride	1
Q4.	A solution when added to crushed egg shells, a gas is evolved which turns lime water milky. The solution contains (a) HCl (b) NaCl (c)KCl (d) NH_4Cl	1
Q5.	What happens when hydrogen gas is passed over heated copper oxide? (a) Black coating on the surface turns blue (b) Black coating on the surface turns brown	1

	(c) Brown coating on the surface turns black (d) Brown coating on the surface turns green	
Q6.	An aqueous solution turns red litmus solution blue. Excess addition of which of the following solution would reverse the change? (a) Baking powder (b) Lime (c)Ammonium hydroxide solution (d) Hydrochloric acid	1
Q7.	The number of isomers of pentane is (a) 2 (b) 3 (c) 4 (d) 5	1
Q8.	A few drops of iodine solution were added to rice water. The solution turned blue-black in colour. This indicates rice water has (a) complex proteins (b) simple proteins (c) starch (d) Fats	1
Q9.	Choose the correct statement that describes arteries: a) They have thick elastic walls, blood flows under high pressure; collect blood from different organs and bring it back to the heart b) They have thin walls with valves inside, blood flows under low pressure and carry blood away from the heart to various organs of the body c) They have thick elastic walls, blood flows under low pressure; carry blood from the heart to various organs of the body. d) They have thick elastic walls without valves inside, blood flows under high pressure and carry blood away from the heart to different parts of the body.	1
Q10.	In human males all the chromosomes are paired perfectly except one. This/these unpaired chromosome is/are (i) large chromosome (ii) small chromosome (iii) Y-chromosome (iv) X-chromosome (a) (i) and (ii) (b) (iii) only (c) (iii) and (iv) (d) (ii) and (iv)	1
Q11.	Which statement is not true about thyroxin? a) Iron is essential for the synthesis of thyroxin b) It regulates carbohydrates, protein and fat metabolism in the body	1

	c) Thyroid gland requires iodine to synthesise thyroxin d) Thyroxin is also called thyroid hormone	
Q12.	Vegetative propagation refers to formation of new plants from a) stem, roots, flowers b) stem, roots, leaves c) stem, flowers, fruit d) stem, leaves, flowers	1
Q13.	The hindrance presented by material of conductor to the smooth passing of electric current is known as: (a) Resistance (b) Conductance (c) Inductance (d) None of these	1
Q14.	A strong bar magnet is placed vertically above a horizontal wooden board. The magnetic lines of force will be: (a) only in horizontal plane around the magnet (b) only in vertical plane around the magnet (c) in horizontal as well as in vertical planes around the magnet (d) in all the planes around the magnet	1
Q15.	A fuse wire is connected with a (a) Live wire (b) In the neutral wire (c) In the earth wire (d) May be connected in any line.	1
Q16.	The front face of a circular loop made by a wire acts as North-pole, the direction of current in this face of the loop will be: (a) Clockwise (b) Anticlockwise (c) Towards North (d) Towards South	1

Q. no 17 to 20 are Assertion - Reasoning based questions. These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true and R is not the correct explanation of A (c) A is true but R is false. (d) A is False but R is true.		
Q17.	Assertion (A): After white washing the walls, a shiny white finish on wall is obtained after two or three days. Reason(R): Calcium oxide reacts with carbon dioxide to form calcium hydrogen carbonate which gives a shiny white finish.	1
Q18.	Assertion (A): A geneticist crossed two pea plants and got 50% tall and 50% dwarf in the progeny. Reason (R) : One plant was heterozygous tall and the other was dwarf.	1
Q19.	Assertion (A): Humans are not truly aerobic. Reason (R): They produce lactic acid anaerobically.	1
Q20.	Assertion (A): When a magnetic needle is kept near a currentcarrying copper wire , the needle shows deflection. Reason (B): The electric current passing through the copper wire has produced a magnetic field.	1
SECTION – B Q. no. 21 to 26 are very short answer questions		
Q21.	What happens to the crystals of washing soda when exposed to air? OR what is bleaching powder chemically called? State one of its use.	2
Q22.	Write a and b in the given flow chart of neuron through which information travels as an electrical impulse. 	2
Q23.	Leaves of a healthy potted plant were coated with vaseline. Will this plant remain healthy for long? Give reasons for your answer.	2
Q24.	Explain the methods used by plants to get rid of excretory products.	2
Q25.	(a) List two causes of hypermetropia. (b) Draw a ray diagram showing correction of hypermetropic eye using suitable optical device. OR The sky appears dark instead of blue to an astronaut . Explain the reason.	2
Q26.	Suggest any four activities in daily life which are eco-friendly.	2

SECTION - C Q.no. 27 to 33 are short answer questions		
Q27.	Write balanced chemical equations for the following chemical reactions: (a) Hydrogen + Chlorine → Hydrogen chloride (b) Lead + Copper chloride → Lead chloride + Copper (c) Zinc oxide + Carbon → Zinc + Carbon monoxide	3
Q28.	A compound P forms the enamel of teeth. It is the hardest substance of the body. It doesn't dissolve in water but gets corroded when the pH is lowered below 5.5. (a) Identify the compound P. (b) How does it undergo damage due to eating chocolate and sweets? What should we do to prevent tooth decay?	3
Q29.	a) Name the respiratory pigment in human beings and state the cell in which it is present. (b) A product is formed is our muscles due to breakdown of glucose when there is lack of oxygen. Name the product and also mention the effect of build-up of this product. (c) Differentiate between fermentation in Yeast and aerobic respiration on the basis of end products formed. OR Mention the roles of (a) muscles in the stomach (b) HCl in stomach (c) Mucus in stomach	3
Q30.	The linear magnification produced by a spherical mirror is +3. (a)Analyse this value and state the (i) type of mirror used and (ii) position of the object with respect to the pole of the mirror. (b)Draw a ray diagram to show the formation of image in this case.	3
Q31.	(a) A real image 2/3rd of the size of an object is formed by a convex lens when the object is at a distance of 12 cm from it. Find the focal length of the lens. (b) State two Laws of refraction of light.	3
Q32.	Two wires A and B are of equal length and have equal resistances. If the resistivity of A is more than that of B, which wire is thicker and why ? For the electric circuit given below  	3

	calculate: (i) current in each resistor (ii) total current drawn from the battery, and (iii)equivalent resistance of the circuit OR An electric iron has a rating of 750 W; 200 V. Calculate: (i) the current required. (ii) the resistance of its heating element. (iii) energy consumed by the iron in 2 hours.	
Q33.	(a) From the following group of organisms create a food chain which is most advantageous for human beings in terms of energy. Hawk, Rat, Cereal plant, Goat, Snake, Human being (b) State the possible disadvantage if the cereal plant is growing in soil rich in pesticides.	3
	SECTION - D Q.no. 34 to 36 are long answer questions.	
Q34.	An organic compound **'A'** is widely used as a preservative in pickles and has a molecular formula '**C'** This compound reacts with ethanol to form a sweet smelling compound **'B'**. (i) Identify the compound **'A'** (ii) Write the chemical equation for its reaction with ethanol to form compound **'B'**. (iii) How can we get compound **'A'** back from **'B'**? (iv) Name the process and write corresponding chemical equation. (v) Which gas is produced when compound 'A' reacts with washing soda? Write the chemical equation. OR (a) Why does carbon form largest number of compounds? (b) Why are some of these called saturated and other unsaturated compounds? (c) Which of these two is more reactive? (d) Write the names of the following compounds (i) $CH_3 – CH_2 – CH_2 – CH_2 – C \equiv C - H$ (ii)$CH_3 – CH_2 - Br$	5
Q35.	(a) Explain the process of regeneration in Planaria. (b) Regeneration is not same as reproduction. Justify. OR (a) Variation beneficial to the species but not necessarily for the individual. Give reason. (b)How does the embryo get nourishment inside the mother's body?	5

Q36.	(a) An electric Iron has a rating of 750 W; 200 V connected to a supply voltage of 200 Volt. Calculate: (i)the current required. (ii)resistance of its heating element (iii) energy consumed by the iron in 2 hours. (b) State Joules law of heating (c)A battery of 10volt carries 20000 coulomb of charge through a resistance of 20 ohm. Find the work done in 10 sec.	5
SECTION - E Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.		
Q37.	A reaction in which two or more reactants combine to form a single product is called a combination reaction. For example, calcium oxide reacts vigorously with water to form calcium hydroxide. The reaction is highly exothermic in nature, as lots of heat is produced in the reaction $CaO + H_2O \rightarrow Ca(OH)_2 + Heat$ Solution of $Ca(OH)_2$ is used for white wash of the walls. Calcium hydroxide reacts slowly with carbon dioxide in air to form a thin layer of calcium carbonate on the walls which gives a shiny appearance to wall. Calcium carbonate will form after two or three days of whitewash. (a) What is the chemical name of quick lime? (b) What happens when excess of CO_2 gas is passed through lime water? (c) Quick lime combines vigorously with water to form (A) which reacts slowly with carbon dioxide in air to form (B). Identify the compound (A) and (B). OR (c)Name the two ways in which the reaction of CaO with water is classified.	4
Q38.	Mendel crossed pure-breed tall (dominant) pea plant with pure-breed dwarf (recessive) pea plant and got pea plants of F1 generation. He again self-crossed the pea plant of F1 generation to get F2 generation. (a) State the type of plants not found in F1 generation but appeared in F2 generation, mentioning the reason for the same. (b) State the ratio of tall plants to dwarf plants in F2 generation. (c) Why did Mendel select a pea plant for his experiments? OR (c) State the percentage of pure tall and pure dwarf by showing a cross.	4

Q39.	Relationship between the distance of object from the lens (u), distance of image from the lens (v) and the focal length (f) of the lens is called lens formula. It can be written as$1/f=1/v-1/u$. The size of image formed by a lens depends on the position of the object from the lens. A lens of Short focal length has more power whereas a lens of long focal length has less power. When the Lens is convex, the power is positive and for concave lens, the power is negative. The magnification produced by a lens is the ratio of height of image to the height of object as the Size of the image relative to the object is given by linear magnification (m). When, m is negative, image formed is real and when m is positive, image formed is virtual. If $m < 1$, Size of image is smaller than the object. If $m > 1$, size of image is larger than the object.	4
	(a) A convex lens forms an image of magnification -2 of the height of image is 6 cm. Find the height of Object. (b) State the nature of image formed when the object is placed at a distance less than the focal length of a convex lens. (c) The object is placed 50 cm from a lens and produces a virtual image at a distance of 10 cm in front of lens. Find the focal length of the lens. **OR** (c) An object 4 cm in height is placed at a distance of 10 cm from a convex lens of focal length 20 cm. Find the position of image?	

SCIENCE (086)

CLASS X

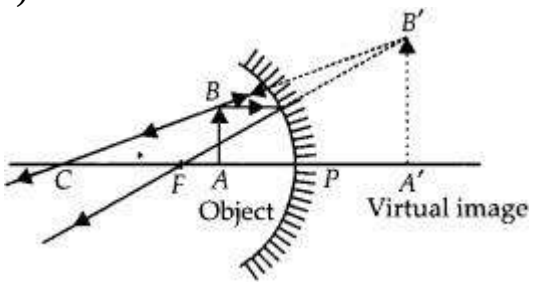
Sample Paper – 2 (2022-23)

Marking Scheme

SECTION – A

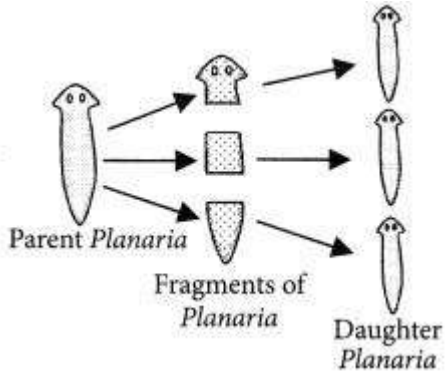
Q.No.	Question	Marks
Q1.	(d) (ii) and (iv)	1
Q2.	(c) (i), (ii) & (iv)	1
Q3.	(b) basic magnesium oxide	1
Q4.	(a) HCl	1
Q5.	(b) Black coating on the surface turns brown	1
Q6.	(d) Hydrochloric acid	1
Q7.	(b) 3	1
Q8.	(c) starch	1
Q9.	(d) They have thick elastic walls without valves inside. The Blood flows under high pressure and carry blood away from the heart to different parts of the body.	1
Q10.	(c) (iii) and (iv)	1
Q11.	(a) Iron is essential for the synthesis of thyroxin	1
Q12.	(b) stem, roots, leaves	1
Q13.	(a) Resistance	1
Q14.	(d) in all the planes around the magnet	1
Q15.	(a) live wire	1
Q16.	(b) Anticlockwise	1
Q17.	(c) A is true but R is false.	1
Q18.	(a)both the assertion and the reason are correct and the reason is the correct explanation of the assertion.	1
Q19.	(a)both the assertion and the reason are correct and the reason is the correct explanation of the assertion	1
Q20.	(a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.	1

SECTION – B Q. no. 21 to 26 are very short answer questions		
Q21.	Washing soda undergoes efflorescence and as a result loses nine water. Washing soda converted to washing powder. $Na_2CO_3 .10 H_2O \rightarrow Na_2CO_3.H_2O + 9H_2O$ OR Bleaching powder is chemically called calcium oxychloride. It is used as a bleaching agent.	2
Q22.	a is cyton and b is axon.	1+1
Q23.	The plant will not remain healthy for long. Vaseline covers the cuticle and blocks the stomata. As a result, It is unable to obtain oxygen from air for respiration, It is unable to perform photosynthesis as no carbon dioxide diffuses from air. In the absence of transpiration, the leaves get heated up and injured.	1 1
Q24.	(i) The plants get rid of gaseous products-through stomata in leaves (ii) The plants get rid of stored solid and liquid waste by the shedding off leaves (iii) The plants store the solid waste in old xylem in the form of gums and resins. (iv) Plants also excrete some waste substances into the soil around them.(ANY TWO)	`1/2X4
Q25.	(a) Hypermetropia is caused due to following reasons: (i) Shortening of the eyeball (ii) Focal length of crystalline lens is too long. (b) correct diagram **OR** As an astronaut moves away from the atmosphere of earth, the atmosphere becomes thin. Due to the absence of molecules (or dust particles) in air, the scattering of light does not take place. Thus, sky appears dark in the absence of scattering.	1 1
Q26	The eco-friendly activities in life are • Planting of trees. • Segregating biodegradable and non-biodegradable wastes. • Using cloth bags, jute bags or paper bags instead of plastic bags. • Creating awareness on environment protection through initiatives and campaigns.(Any two) • (ANY OTHER RELEVANT ANSWER)	0.5X4
SECTION - C Q.no. 27 to 33 are short answer questions		
Q27.	(a) $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$ (b) $Pb_{(s)} + CuCl_{2(aq)} \rightarrow PbCl_{2(aq)} + Cu_{(s)}$ (c) $ZnO_{(s)} + C_{(s)} \rightarrow Zn_{(s)} + CO_{(g)}$	1+1+1

Q28.	(a) The compound P is calcium phosphate. (b) Eating chocolates and sweets produce large amount of acid in the mouth which is not completely neutralised by the saliva produced in the mouth. Excess acid attacks the enamel and tooth decay starts as pH of the mouth falls below 5.5. The best way to prevent tooth decay is to clean the teeth by using toothpastes after eating food. Toothpastes which are generally basic neutralise the excess acid in the mouth.	1+2
Q29.	(a) Respiratory Pigment - Haemoglobin Cell -RBC or erythrocytes. (b) Product-Lactic acid Effect- Fatigue and cramps. (c) In yeast, fermentation produces alcohol and CO_2 while aerobic respiration forms only CO_2 and water.(OR Reaction) **OR** (a) Muscles in Stomach- They bring about churning movement that breaks food into small particles and mixes it with gastric juice. (b) Hydrochloric Acid-Activates enzyme pepsin to digest protein. (c) Mucus- protects the wall of stomach from the action of HCl.	1 1 1
Q30.	Positive value of the magnification indicates that image is virtual and erect. (a)(i) Since the image is magnified, the mirror is concave. (ii) The object is between pole and focus of the mirror as shown (b)  	1 1 1
Q31.	(a) Magnification, $m = \frac{h'}{h} = \frac{v}{u}$ $\Rightarrow \quad v = \frac{h'}{h} \times u = \frac{-\frac{2}{3}h}{h} \times (-12) = 8 \text{ cm}$ Using lens formula, $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\Rightarrow \quad \frac{1}{f} = \frac{1}{8} - \frac{1}{-12} = \frac{3+2}{24} \Rightarrow \quad f = 4.8 \text{ cm}$	2

	(b)The following are the laws of refraction of light. (i) The incident ray, the refracted ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane. (ii) The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for the given pair of media. This law is also known as Snell's law of refraction. If i is the angle of incidence and r is the angle of refraction, then, $\frac{\sin i}{\sin r} = constant = {}^{1}\mu_{2}$	1
Q32.	Let l_A, a_A and R_A be the length, area of cross-section and resistance of wire A and l_B, a_B and R_B are that of wire B. Here, $l_A = l_B$ and $R_A = R_B$ If ρ_A and ρ_B are the resistivities of wire A and B respectively then $R_A = \rho_A \frac{l_A}{a_A}$ and $R_B = \rho_B \frac{l_B}{a_B}$, As $R_A = R_B$ $\therefore \rho_A \frac{l_A}{a_A}, \rho_B \frac{l_B}{a_B}$ or $\frac{\rho_A}{\rho_B} = \frac{a_A}{a_B}$ Since $\rho_A > \rho_B$ therefore $a_A > a_B$ Hence, wire A is thicker than wire B. For parallel combination, $V_1 = V_2 = V_3 = 6V$ (i) Using Ohm's law $I_1 = V_1/R_1 = 6/30 = 0.2$ A $I_2 = V_2/R_2 = 6/10 = 0.6$ A $I_3 = V_3/R_3 = 6/5 = 1.2$ A OR Here, P = 750 W, V = 200 V (i) As P = V7 I = P/V= (750/200) A = 3.75A (ii) By Ohm's law V = IR or R = V/I $\therefore$ R = 200/3.75 Ω = 53.3 Ω (iii) Energy consumed by the iron in 2 hours = P × t = 750 W × 2h = 1.5 kWh or E = (750 × 2 × 3600) J = 5.4×10^6	1 1 1 1 1 1 1

Q33.	(a) A food chain which is most advantageous for human beings in terms of energy is: Cereal plant → Human being (b) Pesticides will be absorbed by growing plants, and enter into the food chain resulting gradual accumulation in each trophic level. This increase in concentration of harmful pesticides in the body of living organisms at each trophic level of a food chain is called biological magnification.	1 2
SECTION - D Q.no. 34 to 36 are Long answer questions.		
Q34.	(i) Ethanoic acid, CH_3COOH $CH_3-COOH + CH_3-CH_2OH \xrightarrow{Acid} CH_3-\underset{\underset{O}{\|}}{C}-O-CH_2-CH_3 + H_2O$ (*Ethanoic* acid) (Ethanol) (Eater) (*Water*) (ii) A B (iii) Esters react in the presence of an acid or a base to give back the alcohol and carboxylic acid. (iv) Saponification $CH_3COOC_2H_5 \xrightarrow{NaOH} C_2H_5OH + CH_3COOH$ (v) CO_2 gas evolved $2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + H_2O + CO_2$ OR (a) Carbon forms large number of compounds called organic compounds due to the self-linking property called catenation. (b) Compounds which has only C-C (single bond) present are saturated compounds whose as those compounds which has C=C (double bond) or C≡C (triple) bond is present are called unsaturated compounds. (c) Unsaturated compounds are more reactive than saturated compounds (d) (i) Bromoethane (ii) Hex-1-yne	1 1 1 1 1 1 1 1 2

Q35.	:Regeneration in Planaria is carried out by specialised cells. These cells proliferated make large numbers of cells. From this mass of cells, different cells undergo changes to become various cell types and tissues.  	3
	(b) Regeneration is not the same as reproduction since most organisms would not normally depend on being cutup to be able to reproduce. OR (a) Variation enables the species to survive in unfavourable conditions. If it happens in one individual, it eliminates with the death of the organism, but if it happens in a species it transmits to next generation by sexual reproduction. (b). The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. This provides a large surface area for glucose and oxygen to pass from the mother to the embryo. The developing embryo will also generate waste substance switch can be removed by transferring them into the mother's blood through the placenta.	2 2 3
Q36.	**(**a)(i)P = 750W V= 200 V P=VI $I = \frac{P}{V} = \frac{750}{200}$ $= 3.75$ A (ii) resistance =? $P=V^2/R$ $R=V^2/P$ $=\frac{200x200}{750}$ = 53.33 ohm (iii) Energy consumed in 2hrs E= P x t =750W x 2 h = 1500 kWh (b) Joule's law of heating states that, When a current 'I ' passes through a conductor of resistance 'r' for time 't' then the heat developed in the conductor is equal to the product of the square of the current, the resistance and time.	2 1 2

	$H = I^2RT$ (c) Work done $W = 20000 \times 10$ $= 200000$ $= 2 \times 10^5$ J	
SECTION - E Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.		
Q37.	(a) calcium Oxide. (b) milkiness of lime water disappears due to the formation of soluble salt Calcium Bicarbonate. (c) A= Calcium hydroxide, B = Calcium carbonate OR Combination reaction, exothermic reaction	1 1 2
Q38.	(a) In the F1 generation, Dwarf trait is recessive trait which was not expressed. After self-pollination, the recessive trait gets expressed in F2 generation (b) Answer- Ratio – 3:1 (c) Main reasons of choosing Pea plant were - Very easy to cultivate and grow - Many visible distinguish characters having contrasting traits are available - Easy to obtain pure breed plant through self-fertilization - Easy crosspollination and fertilization (ANY TWO) OR 25% --Pure tall, 25% ---pure dwarf Cross	1 1 2
Q39.	(a) m = –2, h_2 = –6 cm, h_1 = ? $m = \frac{h_2}{h_1} = -2$ $h_1 = \frac{-6}{-2} = 3\ cm$ (b) virtual and erect, enlarged (c)u = -50 cm, v = -10 cm $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\frac{1}{-10} - \frac{1}{(-50)} = \frac{1}{f}$ $\frac{1}{50} - \frac{1}{10} = \frac{1}{f}$ $\frac{1}{f} = \frac{1-5}{50} = \frac{-4}{50}$ f = – 12.5 cm	1 1 2

OR

Given ,

f =20cm , h=4cm , u= – 10 cm

1/v – 1/u = 1/f

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{v} = \frac{1}{u} + \frac{1}{f}$$

$$\frac{1}{v} = \frac{1}{20} - \frac{1}{10}$$

$$\frac{1}{v} = \frac{1-2}{20}$$

$$\frac{1}{v} = \frac{-1}{20}$$

v = – 20cm

SCIENCE(086)
Class X
Sample Question Paper - 3 (2022-23)

Max. Marks: 80 **Time Allowed: 3 Hours**

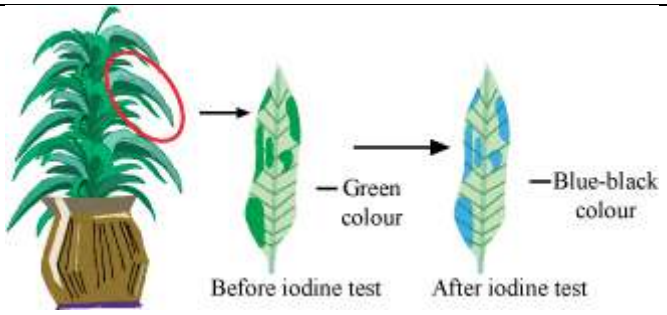
General Instructions:

i. This question paper consists of 39 questions in 5 sections.
ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
iii. Section A consists of 20 objective type questions carrying 1 mark each.
iv. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
v. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words
vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

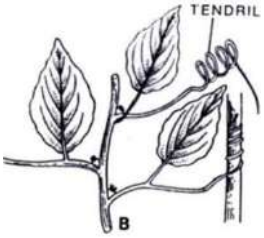
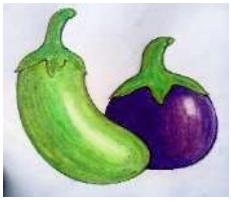
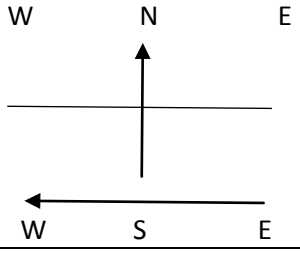
SECTION - A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

Q. No	Questions	Marks
1	An aqueous solution of sodium acetate will turn (a) Methyl orange to yellow (b)Red litmus blue (c)Phenolphthalein solution pink (d) All of these	1
2	Which among the following statement(s) is (are) true? Exposure of silver chloride to sunlight for a long duration turns grey due to (i) the formation of silver by decomposition of silver chloride (ii) sublimation of silver chloride (iii) decomposition of chlorine gas from silver chloride (iv) Oxidation of silver chloride (a) (i) only (b) (i)and (iii) (c) (ii)and (iii) (d) (iv) only	1
3	What happens when hydrogen gas is passed over heated copper oxide? (a) Black coating on the surface turns blue (b) Black coating on the surface turns brown (c)Brown coating on the surface turns black (d)Brown coating on the surface turns green	1
4	An element 'X' is yellow coloured solid, insoluble in water but soluble in carbon disulphide. It has low melting point 114.5°C. It boils at 445°C and it bums with pale blue flame forming pungent smelling gas 'Y' which turns moist blue litmus red. 'X' and 'Y' are (a) C, CO_2 (b) N, NO_2	1

<table>
<tr><td></td><td>(c) S, SO_2
(d) I_2, I_2O_5</td><td></td></tr>
<tr><td>5</td><td>Four metals A, B, C and D are in turn, added to the following solutions one by one and the observations made are tabulated below:
<table>
<tr><th>METALS</th><th>IRON(II) SULPHATE</th><th>COPPER(II) SULPHATE</th><th>ZINC SULPHATE</th><th>SILVER NITRATE</th></tr>
<tr><td>A.</td><td>No reaction</td><td>displacement</td><td>-------</td><td>-------</td></tr>
<tr><td>B.</td><td>displacement</td><td>--------</td><td>No reaction</td><td>--------</td></tr>
<tr><td>C.</td><td>No reaction</td><td>No reaction</td><td>No reaction</td><td>Displacement</td></tr>
<tr><td>D.</td><td>No reaction</td><td>No reaction</td><td>No reaction</td><td>No reaction</td></tr>
</table>
Based on above information, Choose correct order of decreasing reactivity of A, B, C and D.
(a) A>B>C>D (b) B>A>C>D
(c) C>D>A>B (d) D>C>A>B</td><td>1</td></tr>
<tr><td>6</td><td>The chemical reaction between MnO_2& HCl is an example of?
(a) Displacement reaction (b) combination reaction
(c) Redox reaction (d) decomposition reaction</td><td>1</td></tr>
<tr><td>7</td><td>Which of the following represents saponification reaction?
(a) $CH_3COONa + NaOH \rightarrow CH_4 + Na_2CO_3$
(b) $CH_3COOH + C_2H_5OH\ CH_3 \rightarrow COOC_2H_5 + H_2O$
(c) $2CH_3COOH + 2Na \rightarrow 2CH_3COONa + H_2$
(d) $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$</td><td>1</td></tr>
<tr><td>8</td><td>Identify the event that doesn’t occur in the Photosynthesis in the given list.
a. Oxidation of carbon to carbon dioxide.
b. Absorption of light energy by the chlorophyll.
c. Reduction of carbon dioxide to carbohydrates.
d. Conversion of light energy into chemical energy.</td><td>1</td></tr>
<tr><td>9</td><td> 

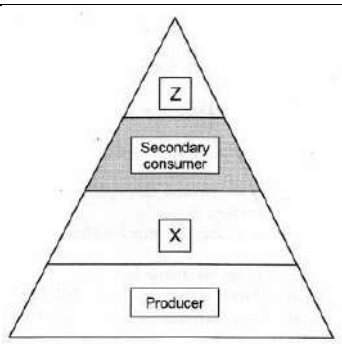
The conclusion drawn out of the experiment as shown in the above figure is
a. oxygen is only product formed during photosynthesis
b. sunlight is essential for photosynthesis
c. Carbon dioxide is given out during respiration
d. Chlorophyll is essential for photosynthesis</td><td>1</td></tr>
</table>

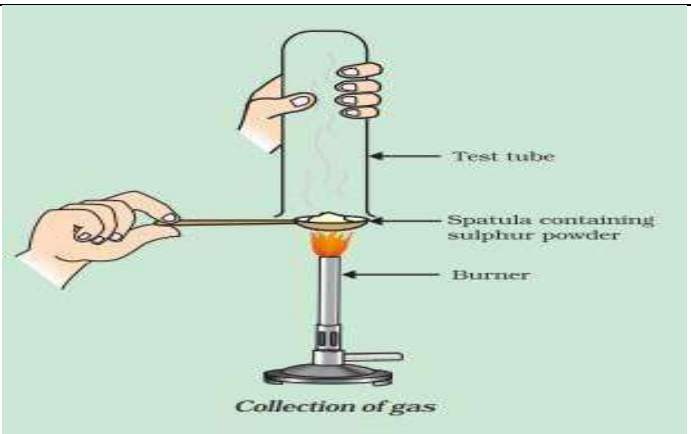
10	Electrical resistivity of a given metallic wire depends upon (a) its length (b) its thickness (c) its shape (d) its nature of the material	1
11	Which of the following plant hormones is responsible for the coiling of tendrils in the plant given below?  a. Auxins b. Cytokinins c. Gibberellins d. Abscisic acid	1
12	The floral part that persists even after complete fruit development in the given figure is  a. Sepals b. Petals c. Style d. Anther	1
13	A current of 1 A is drawn by a filament of an electric bulb. Number of electrons passing through a cross section of the filament in 16 seconds would be roughly (a) 10^{20} (b) 10^{16} (c) 10^{18} (d) 10^{23}	1
14		1

	A constant current flows in a horizontal wire in the plane of the paper from east to west as shown in Figure. The direction of magnetic field at a point will be North to South: (a) directly above the wire (b) directly below the wire (c)at a point located in the plane of the paper, on the north side of the wire (d)at a point located in the plane of the paper, on the south side of the wire	
15	How many phenotypes can occur in the F_2 generation of a monohybrid cross when a pure tall pea plant is crossed with a pure dwarf pea plant in the parental generation? a. one b. two c. three d. four	1
16	Choose the correct option. The magnetic field inside a long straight solenoid-carrying current (a) is zero. (b) remains same as we move towards its end. (c) increases as we move towards its end. (d) is the same at all points.	1
Q. no 17 to 20 are Assertion - Reasoning based questions. These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true and R is not the correct explanation of A (c) A is true but R is false (d) A is False but R is true		
17	**Assertion (A):** The gas collected in the test tube near anode during electrolysis of water burned with a pop up sound when a burning candle is brought near to it. **Reason (R):** Hydrogen gas is a highly flammable gas and it burns with a pop up sound when a burning candle is brought near to it.	1
18	**Assertion :** Accumulation of variations during reproduction is beneficial for a population. **Reason :** Variations help species to thrive better in their surroundings.	1
19	**Assertion :** Aerobic respiration releases more energy as compared to anaerobic respiration. **Reason :** Aerobic respiration occurs in the presence of oxygen.	1
20	**Assertion (A):** For a current in a long straight solenoid N- and S-poles arecreated at the two ends. **Reason (R):** The N- and S-poles exchange position when the direction ofcurrent through the solenoid is reversed.	1

SECTION – B **Q. no. 21 to 26 are very short answer questions.**		
21	What will be the action of the following substances on litmus paper? Dry HCl gas, Moistened NH_3 gas, Lemon juice, Carbonated soft drink OR Name the acid present in ant sting and give its chemical formula. Also, give the common method to get relief from the discomfort caused by the ant sting.	2
22	(a) It is advisable to use iodized salt by the patients suffering from goiter. Give reason. (b) State the response of stem towards light & gravity.	2
23	(a) How do desert plants perform photosynthesis if their stomata remain closed during the day? (b) Leaves of a healthy potted plant were coated with Vaseline. Name any two physiological processes in plants that are affected due to the coating.	2
24	(a) State two fatal consequences of chronic hypertension. (b) Name the instrument that is used to measure blood pressure.	2
25	Draw a ray diagram showing the path of rays of light when it enters with oblique incidence (i) from air into water; (ii) from water into air. OR Why does a light ray incident on a rectangular glass slab immersed in any medium emerges parallel to itself? Explain using a diagram.	2
26	Which one of the following organisms comprising a food chain will possibly have the maximum concentration of harmful chemicals in its body. Give reasons. Eagle, Frog, Grass, Snake, Grasshopper.	2
SECTION - C **Q.no. 27 to 33 are short answer questions.**		
27	(i) Identify the oxidizing agent (oxidant) & Reducing agent (Reductant) in the following reactions (a) $Pb_3O_4 + 8HCl \rightarrow 3PbCl_2 + Cl_2 + 4H_2O$ (b) $V_2O_5 + 5Ca \rightarrow 2V + 5CaO$ (ii)Why do we store silver chloride in dark coloured bottles?	3
28	Salt A commonly used in bakery products on heating gets converted into another salt B which itself is used for removal of hardness of water, and a gas C is evolved. The gas C, when passed through lime water, turns it milky. Identify A, B and C. Write the chemical equations involved in above process.	3

29	(a) State the purpose of formation of urine. (b) What would happen if there were no tubular reabsorption in the nephrons of kidney? (c) Name two waste products which are stored in old xylem in plants.	3
30	Make a diagram to show how hypermetropia is corrected. The near point of a hypermetropic eye is 1 m. What ¡s the power of a lens required to correct this defect? Assume that near point of the normal eye is 25 cm.	3
31	Draw ray diagrams showing the image formation by a concave lens when an object is placed (a) at the focus of the lens (b) between focus and twice the focal length of the lens (c) beyond twice the focal length of the lens	3
32	Describe the activity that shows that a current-carrying conductor experiences a force perpendicular to its length and the external magnetic field. How does Fleming's left-hand rule help us to find the direction of the force acting on the current carrying conductor? **OR** (a) Draw a labelled circuit diagram to show the pattern of the magnetic field lines around a straight current carrying long conducting wire . (b) State the rule that is used to find the direction of magnetic field associated with a current carrying conductor. (c) A compass is placed near the current carrying conductor . What will happen to the deflection of the needle if: (i) the distance between the compass and the current – carrying straight conductor is decreased . (ii)the current through the conductor is increased .	3
33	(a) In the following food chain, grasses provide 500J of energy to grasshoppers. How much of energy will be available to snakes from frogs? Grasses ———> grasshoppers ———> frogs ———> snakes (b) Producers always occupy the first trophic level in any food chain. Why? (c) Write the appropriate names of trophic levels Z and X in the figure.	3

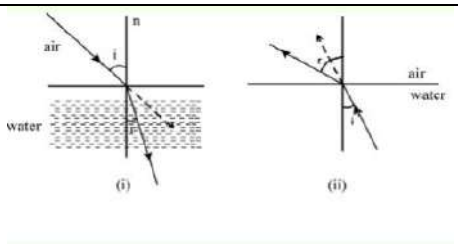
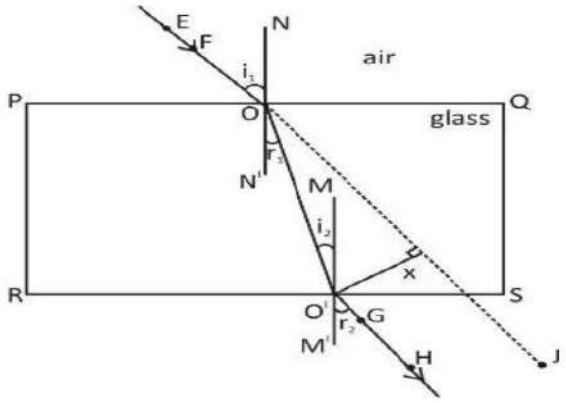
		
	SECTION - D **Q.no. 34 to 36 are Long answer questions.**	
34	i) Draw the possible isomers of the compound with molecular formula C_3H_6O and also give their electron dot structures. ii) Ethene is formed when ethanol at 443 K is heated with excess of concentrated sulphuric acid. What is the role of sulphuric acid in this reaction? Write the balanced chemical equation of this reaction. OR i) Name the functional groups present in the following compounds (a) $CH_3\ CO\ CH_2\ CH_2\ CH_2\ CH_3$ (b) $CH_3\ CH_2\ CH_2COOH$ (c) $CH_3\ CH_2\ CH_2\ CH_2\ CHO$ (d) $CH_3\ CH_2\ OH$ ii) A compound X is formed by the reaction of a carboxylic acid $C_2H_4O_2$and an alcohol in presence of a few drops of H_2SO_4 .The alcohol on oxidation with alkaline $KMnO_4$ followed by acidification gives the samecarboxylic acid as used in this reaction. Give the names and structures of (a) Carboxylic acid, (b) alcohol and (c) the compound X. Also write thereaction.	5
35	(a) Explain briefly the structure and two functions of placenta. (b) State any two events that occur when the egg is not fertilized.	5
36	(a) A heater coil is rated 100 W, 200 V . It is cut into two identical parts. Both parts are connected together in parallel to the same source of 200 V. Calculate the energy liberated per second in the new combination. (b) An electric heater draws a current of 5 A and its element has a resistance of 50 Ω. If the energy released is 375 kJ ,then calculate the time for which it is switched on	5
	SECTION-E **Q.no.37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.**	
37	Pratyush took Sulphur powder on a spatula and heated it. He collected the gas evolved by inverting a test tube over it, as shown in figure below.	4

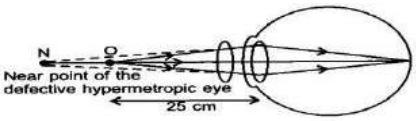
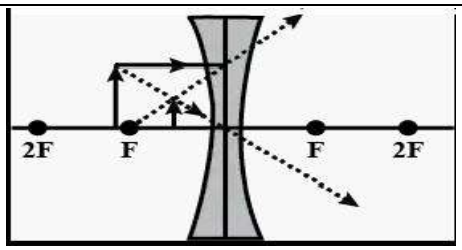
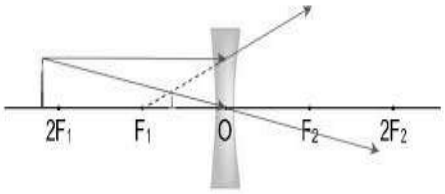
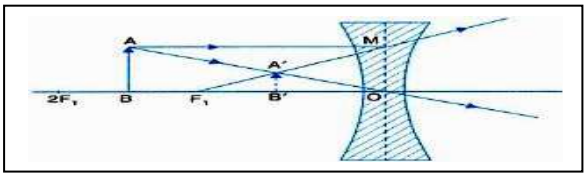
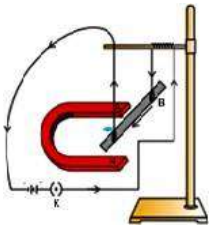
	 (a) What will be the action of gas on (i) Dry litmus paper (ii) Moist litmus paper (b) State nature of oxide formed on burning Sulphur. (c) Write a balanced chemical equation for the reaction taking place. OR In place of Sulphur powder if carbon is taken .What do you observe? Explain with equation.	
38	Seema crossed pure breed pea plants having round-yellow seeds with wrinkled green seeds and found that only A-B type of seeds were produced in the F_1 generation. When F_1 generation pea plants having A- B type of seeds were crossbreed by self-pollination, then in addition to the original round yellow and wrinkled green seeds, two new varieties A-D and C-B types of seeds were also obtained. (a) State the genotype of the A-B seeds obtained in F_1 generation. (b) What would be the number of A-B seeds in F_2 generation, if the total number of seeds obtained in F_2 generation is 1600? (c) Out of total 320 seeds obtained in the F_2 generation, calculate the number of seeds that have: (i) both the recessive traits. (ii) one dominant and one recessive trait OR (i) Write the phenotype of A-D and C-B seeds obtained in F_2 generation. (ii) State the phenotypic ratio of the given cross in F_2 generation.	4
39	The spherical mirror forms different types of images when the object is placed at different locations. When the image is formed on screen, the image is real and when the image does not form on screen, the image is virtual. When the two reflected rays meet actually, the image is real and when they appear to meet, the image is virtual. A concave mirror always forms a real and inverted image for different positions of the object. But if the object is placed between the focus and pole. the image formed is virtual and erect. A convex mirror always forms a virtual, erect and diminished image . (a) Identify the type of mirror that is used to get the full length image of a distant tall building. (b) Where should the bulb be placed in torches, search lights and	4

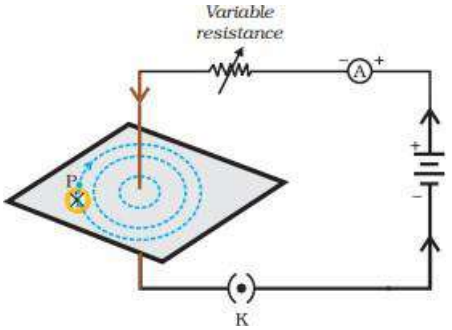
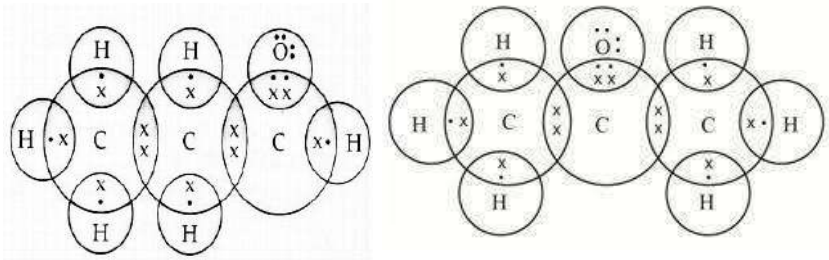
	headlights of vehicles? (c) Size of a real image of an object formed by a concave mirror having a focal length of 20cm is observed to be reduced to 1/3rd of its size. At what distance the object has been placed from the mirror? OR (c) An object is placed at a distance equal to twice of focal length of a convex lens. Draw a diagram to show the formation of image in this case.	

SCIENCE (086)
CLASS X
Sample Paper -3 (2022-23)
Marking Scheme

Q. No	ANSWER KEY	MARKS
	SECTION-A	
1	(d)All of these	1
2	(a) (i) only	1
3	(b) Black coating on the surface turns brown	1
4	(c) S, SO_2	1
5	(b) B>A>C>D	1
6	(c) Redox reaction	1
7	(d) $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$	1
8	a. Oxidation of carbon to carbon dioxide.	1
9	d. Chlorophyll is essential for photosynthesis	1
10	(d) nature of the material	1
11	a. Auxins	1
12	a. sepals	1
13	(a) 10^{20}	1
14	(b) directly below the wire	1
15	b. Two (Tall and Dwarf)	1
16	(d) is the same at all points.	1
17	(d) A is false R is true.	1
18	(a) Both A and R are true and R is the correct explanation of A	1
19	(b) Both A and R are true and R is not the correct explanation of A	1
20	(b) Both A and R are true and R is not the correct explanation of A	1
21	Dry HCl gas: No change on litmus paper. Moistened NH_3 gas (basic): Red litmus will turn blue. Lemon Juice (contains citric acid): Blue litmus will turn red. Carbonated soft drinks (contains carbonic acid): Blue litmus will turn red. OR Formic acid or Methanoic acid is present in the ant sting. The chemical formula is HCOOH. By applying some wet baking soda on the affected area, it gives relief.	0.5 x 0.4 1 1
22	(a) Iodine is required by the thyroid gland to make thyroxine hormone. Iodised salt provides iodine needed by thyroid gland to make sufficient thyroxin for our body. The use of iodised salt prevents risk of goiter. (b) Stem show positive response towards light and negative responsetoward gravity.	1 1
23	(a) They take in CO_2 at night, and is stored in the form of an intermediate and is used during the day for photosynthesis.	1

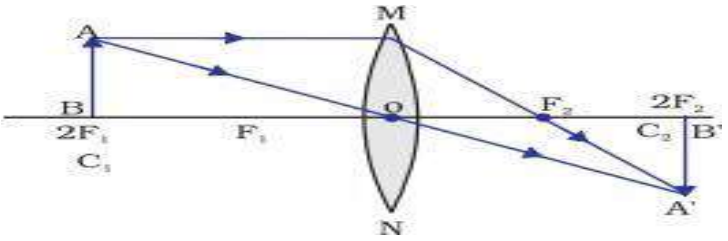
	(b) Photosynthesis, respiration	1
24	(a) Rupture of artery and internal bleeding. (b) Sphygmomanometer	1 1
25	 OR The ray of light bends towards normal when moving from a rarer to a denser medium, and away from normal when moving from a denser to a rarer medium is known as refraction of light. A glass slab's opposite faces are parallel. As a result, the first interface's angle of refraction becomes the second interface's angle of incidence,$<r_1 = <i_2$. The emerging ray bends to the point where, $<i = <r_2$.  	2
26	Eagle, Grass ——> Grasshopper ——> Frog ———> Snake ——> Eagle As Eagle occupies the top most position in the food chain (Last trophic level)	1 1
27	(i)(a) Oxidant- Pb_3O_4 Reductant- HCl (b) Oxidant -V_2O_5 Reductant - Ca (ii) To prevent photolytic decomposition of AgCl .	0.5x4 1
28	Salt A (Sodium bicarbonate) commonly used in bakery products on heating gets converted into another Salt B (Sodium Carbonate) which itself is used for removal of hardness of water and a Gas C (Carbon Dioxide) is evolved. The Gas C (Carbon Dioxide) when passed through lime water, turns it milky. $2NaHCO_3$+ Heat → $Na_2CO_3 + H_2O + CO_2$ $Ca(OH)_2$ (aq) + CO_2 → $CaCO_3$ +H_2O	0.5x 3 1 0.5
29	(a) Our body must get rid of nitrogenous waste because their accumulation in the body is poisonous and harmful for us. (b) The body would lose vital nutrients such as glucose, amino acids,	1+1+1

	salts and water. (c) Resins and gums	
30	 To correct the defect, the image of an object at 25 cm should be brought at 100 cm. $\therefore \quad \frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{-100} - \frac{1}{-25}$ $\Rightarrow \quad \frac{1}{f} = \frac{-1}{100} + \frac{1}{25} = \frac{-1+4}{100} = \frac{3}{100}$ $\therefore \quad f = +\frac{100}{3} = +33.3 \text{ cm.}$ So, a convex lens of focal length 33.3 cm is required. Power, $P = \frac{100}{33.3} = 3.0$ D.	1+2
31	  	1+1+1
32	Take a little aluminium rod and write AB on it of about centimeter. Suspend it horizontally from a stand using two connecting cables. Place a powerful horseshoe magnet between the two poles with the magnetic field pointing upwards. Place the north pole of the magnet vertically below the aluminium rod and the south pole vertically above it for this. Connect the aluminium rod to a battery, a key, and a rheostat in series. Now, from end B to end A, run a current through the aluminium rod. It is observed that the rod is displaced towards the left. Reverse the direction of the stream flowing through the rod to see which way it is displaced. It's moving right now.  Fleming Left-hand rule: When an electric current flows through a straight wire and an external magnetic field is put across it, the wire experiences a force that is perpendicular to both the field and the direction of the current flow, according to Fleming's left-hand rule. The direction of the force, magnetic field, and current may all be determined using this rule. The thumb, first finger, and second finger of the left hand can all be held perpendicular to each other. The direction of motion arising from the force on the conductor is represented by the thumb. The first finger	3

	represents the magnetic field's direction. The current's direction is represented by the second finger. **OR** (a)  (b) Imagine that you are holding a current-carrying straight conductor in your right hand such that the thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field. This is known as the right-hand thumb rule. (c) (i) deflection will increase (ii) deflection will increase	**OR** 1 1 ½ ½
33	**(a)** Energy available from grasshoppers to frogs 500 J % 10 = 50 J Energy available to snakes = 50 J% 10 = 5J. **(b)** Only producers have the ability to trap solar energy and manufacture organic food through the process of photosynthesis. **(c) X:** Primary consumer. **Z:** Tertiary consumer.	1+1+1
34	i) Possible isomers are Propanal - CH_3CH_2CHO Propanone- CH_3COCH_3  (ii)CH_3CH_2OH $\underrightarrow{Conc.H_2SO_4,\ 443K}$ $CH_2=CH_2+H_2O$	1/2x2 2 1

	Therefore, concentrated sulphuric acid removes water from ethanol, thereby, acting as a dehydrating agent. OR i) (a) Ketone b) carboxylic acid c) aldehyde d) Alcohol () ii) carboxylic acid- Ethanoic acid , CH_3COOH (1/2X3) Alcohol- Ethanol , CH_3CH_2OH X- Ester , $CH_3COOCH_2CH_3$ $CH_3COOH + CH_3CH_2OH \xrightarrow{\text{Heat, Conc. } H_2SO_4} CH_3COO\,CH_2CH_3 + H_2O$ $CH_3CH_2OH \xrightarrow{Alk.KMnO_4} CH_3COOH$	1 1/2x4 1 1 1
35	(a) Placenta is a disc like structure that forms a connection between the embryo and the uterine wall. It is consisting of numerous villi that increases the surface area for absorption. It is an organ of exchange that provides oxygen and nutrients to fetus and removes waste produced by fetus. Structure- Function- (b) Disintegration of egg, Breakdown of endometrial lining of uterus and Vaginal bleeding called menstruation. (Any two)	1.5 1.5 2
36	(a) $P = 100W$ $V = 200V$ $P = \frac{V^2}{R}$ $R = \frac{(200)^2}{400} = 100\Omega$ Net Resistance: $\frac{1}{R_t} = \frac{1}{R'} + \frac{1}{R'} = \frac{2}{R'}$ $\Rightarrow R_t = \frac{R'}{2} = \frac{200}{2} = 100\Omega$ Net Power= $P = \frac{V^2}{RT} = \frac{40000}{100} = 400W$	5

	(b) Energy (E) = I^2Rt $t = \frac{E}{I^2 x R}$ $=375000/(5)^2 x 50$ $=300s$	
37	(a) i) no change ii) Blue litmus changed to red (b) acidic (c) $S + O_2 \longrightarrow SO_2$ $SO_2 + H_2O \longrightarrow H_2SO_3$ OR $C + O_2 \longrightarrow CO_2$ $CO_2 + H_2O \rightarrow H_2CO_3$	1 1 2 1
38	(a) Yellow and round (b) 900 (c) (i) 20 (ii) 120 OR (i) A-D – Yellow, wrinkled, C-B Green round (alternate answers should also be considered) (ii) 9:3:3:1	1 1 2 0.5+0.5 1
39	(a) Convex Mirror (b) Placed near the focus. (c) $\frac{-v}{u} = -\frac{1}{3} \Rightarrow$ $\frac{v}{u} = \frac{1}{3}$ $v = \frac{u}{3}$ $\frac{1}{v} = \frac{3}{u}$ $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ $\frac{3}{v} + \frac{1}{u} = \frac{1}{(-20)}$	4

	$\frac{4}{u} = \frac{1}{-20}$ u= - 80 cm OR Diagram  	

SCIENCE (086)

CLASS-X

Sample Question Paper – 4 (2022-23)

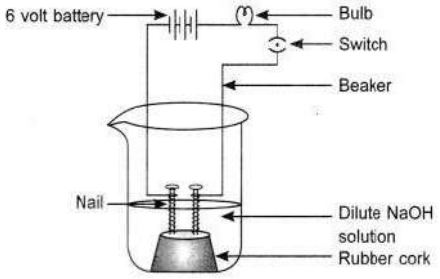
Max. Marks: 80 **Time Allowed:3 Hours**

General Instructions:

i. *This question paper consists of 39 questions in 5 sections.*
ii. *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
iii. ***Section A** consists of 20 objective type questions carrying 1mark each.*
iv. ***Section B** consists of 6 Very Short questions carrying 02marks each. Answers to these questions should in the range of 30 to50 words.*
v. ***Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to80 words*
vi. ***Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*
vii. ***Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

SECTION-A

Select and write one most appropriate option out of the four options given for each of the questions1–20

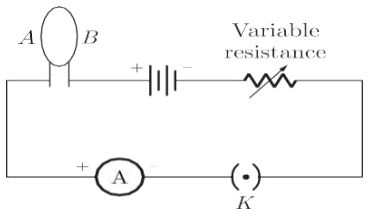
Q.No	Questions	Marks
1	The apparatus given in the adjoining figure was set up to demonstrate electrical conductivity.  Which of the following statement(s) is (are) correct? (i) Bulb will not glow because electrolyte is not acidic. (ii) Bulb will glow because NaOH is a strong base and furnishes ions for conduction. (iii) Bulb will not glow because circuit is incomplete. (iv) Bulb will not glow because it depends upon the type of electrolytic solution. (a) (i) and (iii) (b) (ii) and (iv) (c) (ii) only (d) (iv) only	1

2	Which of the following statements about the given reaction are correct? $3Fe\ (s) + 4H_2O\ (g) \rightarrow Fe_3O_4\ (s) + 4\ H_2\ (g)$ (i) Iron metal is getting oxidized (ii) Water is getting reduced (iii) Water is acting as reducing agent (iv) Water is acting as oxidising agent (a) (i), (ii) and (iii) (b) (in) and (iv) (c) (i), (ii) and (iv) (d) (ii) and (iv)	1
3	In Rhizopus, tubular thread like structures bearing sporangia at their tips are called (a) filaments (b) hyphae (c) rhizoids (d) roots	1
4	With the reference to four gases CO_2,CO, Cl_2 and O_2, which one of the options in the table is correct?	1

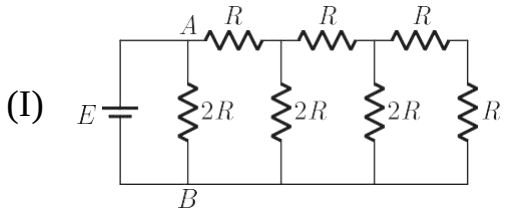
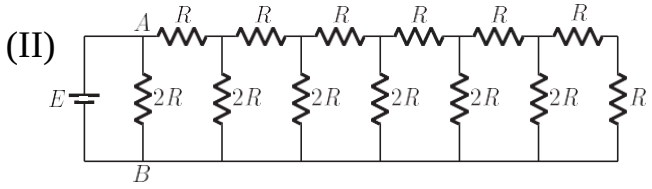
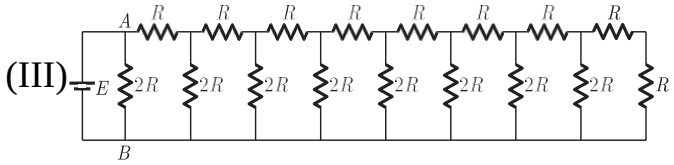
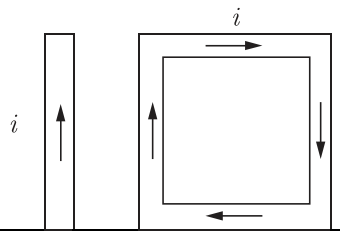
Option	Acidic Oxide	Used in Treatment of Water	Product of respiration	Product of incomplete combustion
a	CO	Cl2	O2	CO
b	CO2	Cl2	CO2	CO
c	CO2	O2	O2	CO2
d	CO2	O2	Co2	CO2

5.	A substance 'X' is used in white-washing and is obtained by heating limestone in the absence of air. Identify 'X'. (a) $CaOCl_2$ (b) $Ca(OH)_2$ (c) CaO (d) $CaCO_3$	
6.	An aqueous solution turns red litmus solution blue. Excess addition of which of the following solution would reverse the change? (a) Baking powder (b) Lime (c) Ammonium hydroxide solution (d) Hydrochloric acid	
7.	Which of the following is the formula of Butanoic acid? (a) $CH_3CH_2CH_2CH_2COOH$ (b) $COOH-CH_2-CH_2-CH_2-CH_3$ (c) $CH_3-\underset{\displaystyle COOH}{\underset{\vert}{CH}}-CH_2-CH_3$ (d) $CH_2-CH_2-CH_2-COOH$	

8.	In which mode of nutrition an organism derives its food from the body of another living organism without killing it? (a) Saprotrophic nutrition (b) Parasitic nutrition (c) Holozoic nutrition (d) Autotrophic nutrition	
9.	Roots of the plants absorb water from the soil through the process of: (a) diffusion (b)transpiration (c) osmosis (d) None of these	
10.	The number of pairs of sex chromosomes in the zygote of an human being is (a) 2 b)3 c)1 d) 4	
11	Roots of plants are: (a)positively geotropic b) negatively geotropic c) positively phototropic (d) None of these	1
12	In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate? (a) Lead sulphate (insoluble) (b) Lead acetate (c) Ammonium nitrate (d) Potassium sulphate.	1
13	Two unequal resistances are connected in parallel. Which of the following statement is true (a) current is same in both. (b) current is larger in higher resistance. (c) voltage-drop is same across both. (d) voltage-drop is lower in lower resistance.	1

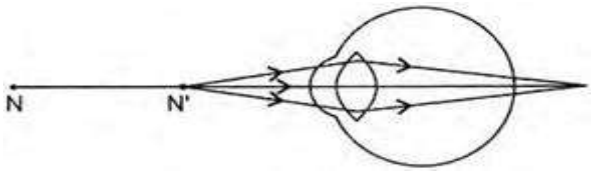
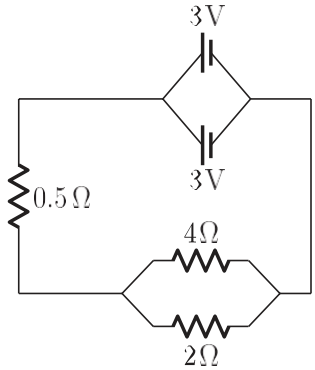
14	 A circular loop placed in a plane perpendicular to the plane of paper carries a current when the key is ON. The current as seen from points A and B (in the plane of paper and on the axis of the coil) is anti clockwise and clockwise respectively. The magnetic field lines point from B to A. The N-pole of the resultant magnet is on the face close to (a) A (b) B	1

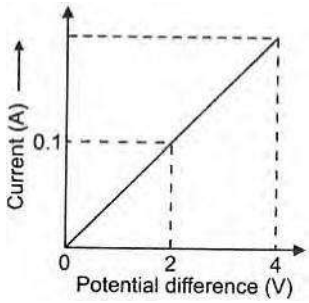
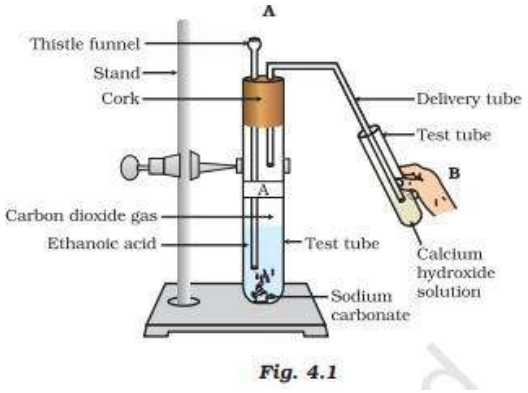
	(c) A if the current is small, and B if the current is large. (d) B if the current is small and A if the current is large.	

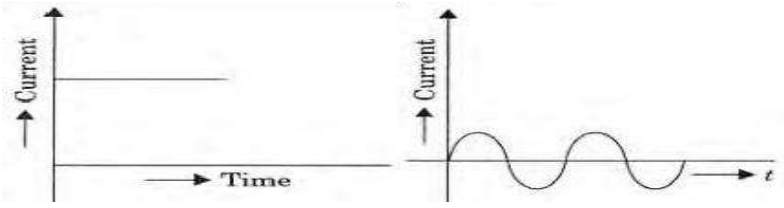
15	Three different circuits (I, II and III) are constructed using identical batteries and resistors of R and 2R ohm. What can be said about current I in arm AB of each circuit?    *(a) $I_I > I_{II} > I_{III}$* *(b) $I_I < II_{II} < I_{III}$* *(c) $I_{II} < I_I < I_{III}$* *(d) $I_I = I_{II} = I_{III}$*	1
16	A rectangular loop carrying current I is situated near a long straight wire such that the wire is parallel to one of the sides of the loop and is in the plane of the loop. If a steady current I is created in wire as shown in figure below, then the loop will  	1

	(a) rotate about an axis parallel to the wire (b) move towards the wire (c) move away from the wire or towards right (d) remain stationary	
Q.no17 to 20 are Assertion – Reasoning based questions. **These consist of two statements– Assertion(A)andReason(R).Answerthesequestionsselectingtheappropriateoption given below:** **(a) Both A and Rare true and R is the correct explanation of A** **(b) Both A and R are true and R is not the correct explanation of A** **(c) A is true but R is false** **(d) A is False but R is true**		
17	Assertion: Respiration is an exothermic process Reason:CO_2 is released during the process of respiration	1
18	Assertion (A): The sex of the child is determined by chromosome received by father. Reason (R): A human male has one X and one Y chromosome.	1
19	Assertion (A) :In plants there is no need of specialized respiratory organs. **Reason (R) :**Plants do not have great demands of gaseous exchange	1
20	Assertion : Safety fuses are made up of materials having a low melting point. Reason : Safety fuses should be less resistant to electric current.	1
SECTION–B Q.no. 21 to 26 are very short answer questions.		
21	During the reaction of some metals with dilute hydrochloric acid, following observations were made. (a) Silver metal does not show any change (b) The temperature of the reaction mixture rises when aluminium (Al) is added. (c) The reaction of sodium metal is found to be highly explosive (d) Some bubbles of a gas are seen when lead (Pb) is reacted with the acid. Explain these observations giving suitable reasons **OR** Write the balanced chemical equations for the following	2

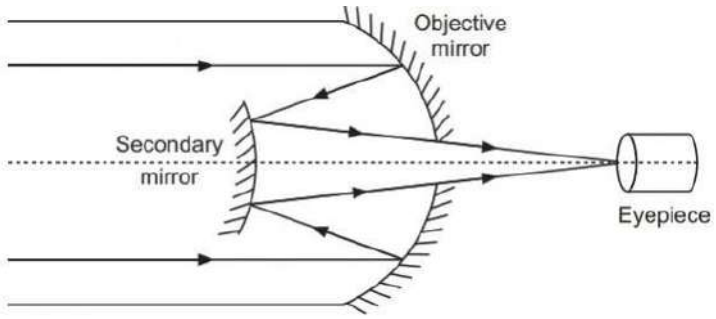
	reactions and identify the type of reaction in each case. (a) Nitrogen gas is treated with hydrogen gas in the presence of a catalyst at 773K to form ammonia gas. (b) Sodium hydroxide solution is treated with acetic acid to form sodium acetate and water.	
22	State one major difference between Auxin and Cytokinin.	2
23	What are the different ways in which glucose is oxidised to provide energy in various organisms?	2
24	Major amount of water is selectively reabsorbed by the tubular part of nephron in humans. What are the factors on which the amount of water reabsorbed depend?	2
25	(a) What is meant by least distance of distinct vision? (b) How does the thickness of the eye lens change when we shift looking from a distant tree to read a book? **OR** An old person is unable to see clearly nearby object as well as distant objects, (i) What defect of vision is he suffering from? (ii) What kind of lens will be required to see clearly the nearby as well as distant objects? Give reason.	2
26	State the consequences if biodegradable wastes are allowed to accumulate.	2
SECTION-C Q.no.27to33areshortanswer questions.		
27	A magnesium ribbon is burnt in oxygen to give a white compound X accompanied by emission of light. If the burning ribbon is now placed in an atmosphere of nitrogen, it continues to burn and forms a compound Y. (a) Write the chemical formulae of X and Y. (b) Write a balanced chemical equation, when X is dissolved in water.	3
28	Make an aquatic food chain upto tertiary consumer level. Statethe trophic level at which concentration of pesticide is maximum and why?	3

29	Give reasons for the following : (i) Glottis is covered by epiglottis (ii) Lung alveoli are richly supplied with blood capillaries, (iii) The wall of trachea is supported by cartilage rings. OR (a) What do you mean by double circulation of blood ? (b) Why is it necessary?	3
30	(a) Water has refractive index 1.33 and alcohol has refractive index 1.36. Which of the two media is optically denser? Give reason for your answer. Draw a ray diagram to show the path of a ray of light passing obliquely from water to alcohol. (b) The absolute refractive index of diamond is 2.42 and the absolute refractive index of glass is 1.50. Find the refractive index of diamond with respect to glass.	3
31	Study the diagram and answer the questions the follows :  a. Identify the defect of vision represented by this diagram. b. List the two possible causes of this defect. c. Name the type of lens used to rectify this defect.	3
32	 (a) What is the current flowing through 4 Ω resistor? (b) What is total potential difference supplied to the circuit?	3

	(c) Calculate the effective resistance of the above circuit. OR (a) Calculate the resistance of the wire using graph.  (b) How many 176 Ω resistors in parallel are required to carry 5A on a 220 V line?	
33	For making cake, baking powder is taken. If at home your mother uses baking soda instead of baking powder in cake, (a) how will it affect the taste of the cake and why? (b) how can baking soda be converted into baking powder? what is the role of tartaric acid added to baking soda?	3
	SECTION-D Q.no.34 to36 are Long answer questions.	
34	Look at Figure 4.1 and answer the following questions  *Fig. 4.1* (a) What change would you observe in the calcium hydroxide solution taken in tube B? (b) Write the reaction involved in test tubes A and B respectively. (c) If ethanol is given instead of ethanoic acid, would you expect the same change? (d) How can a solution of lime water be prepared in the laboratory? **OR** Explain the given reactions with the examples	5

	(a) Hydrogenation reaction (b) Oxidation reaction (c) Substitution reaction (d) Saponification reaction (e) Combustion reaction	
35	Draw the diagram of a bisexual flower and show its male and female reproductive parts. What is the function of anther and stigma? **OR** (a) a) State the role of placenta in the development of embryo. (b) b) Suggest three contraceptive methods to control the size of human population which is essential for the growth and prosperity of a country.	5
36	In our daily life we use two types of electric current whose current-time graphs are given below: a. Name the type of current in two cases. b. Identify any one source for each type of current. c. What is the frequency of current in case (b) in our country? d. On the basis of these graphs list two differences between the two currents. e. Out of the two which one is used in transmitting electric power over long distances and why?  (a) (b)	5

SECTION-E Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.		
37	Metals occur in nature in the free as well as in the combined state. The less reactive metals are generally found in the free state. Most of the metals, however are found in the combined form as minerals. The minerals from which metals can be obtained on a commercial scale are called ores. In other words, the minerals from which metals can be extracted profitably are called ores. Thus, bauxite ($Al_2O_3.2H_2O$)and clay ($Al_2O_3.2SiO_2.2H_2O$) are minerals of aluminium. However, it is bauxite that is chiefly used to obtain aluminium commercially. So, bauxite, and not clay, is an ore of aluminium. a) Name two metals occurs in native state b) Write the name of the sulphide ores of Mercury and Zinc c) Write the chemical equations for roasting of copper glance. **OR** c)Write the chemical equations for the roasting of sulphide ore of mercury.	4
38	A scientist cross – bred tall (dominant) pea plant with pure bred dwarf (recessive) pea plants. He got pea plants in F_1 generation. He then self-crossed of F_1 generation and obtained pea plants of F_2 generation. a) State the type of plants not obtained in F_1 generation but appeared in F_2 generation mentioning the reason for the same. b) What do the plants of F_1 generation look like? c) Explain the phenotypic ratio obtained. Or c)Explain the genotypic ratio obtained	4

39	Suraj wanted to see the stars of the night sky. He knows that he needs a telescope to see those distant stars. He finds out that the telescopes, which are made of lenses, are called refracting telescopes and the ones which are made of mirrors are called reflecting telescopes.  A **reflecting telescope** (also called a **reflector**) is a telescope that uses a single or a combination of curved mirrors that reflects light and forms an image. The reflecting telescope was invented in the 17th century, by Isaac Newton, as an alternative to the refracting telescope, at that time. Reflecting telescope is a design that allows for very large diameter objectives (objective mirror M_1). Almost all of the major telescopes used in astronomy research are reflectors. Reflecting telescopes come in many design variations and may employ extra optical elements to improve image quality or place the image in a mechanically advantageous position. (Secondary mirror $\mathbf{M_2}$) (a) Based on the diagram shown, what kind of mirrors would Suraj need to make the telescope? (b) If the radii of curvature of the mirrors $\mathbf{M_1}$(objective mirror) and $\mathbf{M_2}$(Secondary mirror) are 17.5 m and 10.5m respectively , then what would be the ratio of the focal length of M_1 and M_2 ? (c) Suraj did some preliminary experiment with the mirrors and found out that the magnification produced by the (objective mirror) M_1 is **+ 4**.If he did the experiment with M_1 and found an image at 36 cm from the mirror, at what distance did he put the object? **OR** (c)While doing an activity Suraj found that the height of the image became $1/4^{th}$ of the height of the object when it is placed in front of the secondary mirror .Then find the nature position and size ofthe image formed.	4

SCIENCE (086)

CLASS X

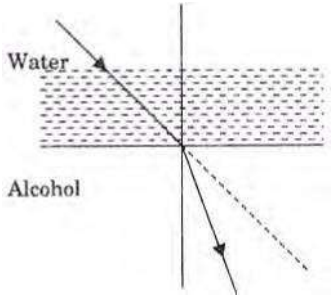
Sample Paper – 4 (2022-23)

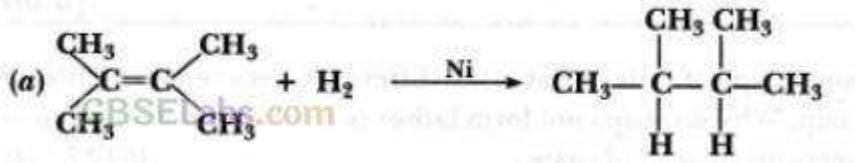
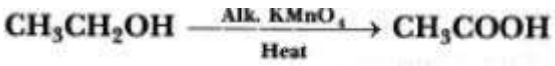
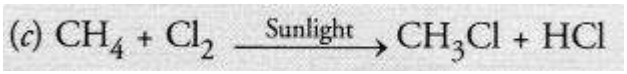
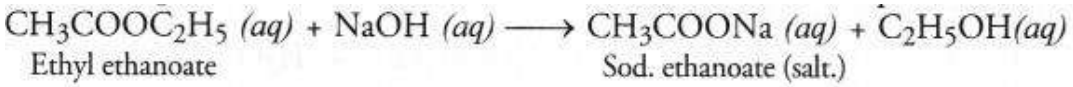
Marking Scheme

Q. No	**Questions**	Marks
	SECTION -A	
1	c	1
2	c	1
3	b	1
4	b	1
5	c	1
6	d	1
7	d	1
8	b	1
9	c	1
10	c	1
11	a	1
12	b	1
13	c)voltage-drop is same across both	1
14	a)A	1
15	(d) $I_I = I_{II} = I_{III}$	1
16	b)move towards the wire	1
17	b	1
18	a	1
19	a	1
20	c)A is true but R is false	1

	SECTION-B	
21	a)Silver metal does not react with dilute HCl because silver lies low in the reactivity series of metal (b) The temperature of the reaction mixture rises when aluminium is added because it is an exothermic reaction. (c) The reaction of sodium metal is found to be highly explosive because Sodium is highly reactive thus resulting in an exothermic reaction which lead to an increase in temperature. (d) When lead is treated with hydrochloric acid, bubbles of hydrogen gas are evolved. OR $N_2 + 3H_2 \rightarrow 2NH_3$ Combination Reaction $NaOH + CH_3COOH \rightarrow CH_3COONa + H_2O$ Double displacement Reaction	½ x4
22	Auxin promotes apical dominance whereas Cytokinin promotes cell division.	2
23	FIG.6.8 ,pg 102 (NCERT BOOK)	2
24	a) Amount of extra water present in the body. b) Amount of dissolved waste present .	2
25	a)Least distance of distinct vision means the minimum distance upto which an eye can see clearly. 1 b)To see distant object focal length of eye lens must be more so it becomes thinner when we want to read a book eye lens is comparatively thicker. 1 OR (a) Presbyopia. 0.5 (b)This defect is connected by using bi-focal lens. A bi-focal lens consists of a concave lens which forms the upper surface of lens and a convex lens which form the lower surface of the lens. The upper surface enables the person to see distant objects clearly and the lower surface helps the person to see the near objects clearly. 1.5	2
26	If biodegradable wastes are allowed to accumulate then the following consequences can be seen----	2

	a) foul smell is emitted out b) can be a source of further infection. (Any other relevant point)	
	SECTION - C	
27	a) X- MgO, Y – Mg_3N_2 (b) $MgO(s) + H_2O(l) \longrightarrow Mg(OH)_2(aq)$ Magnesium oxide — Water — Magnesium hydroxide	1 2
28	Phytoplankton-→Zooplankton-→Small fish-→Big fish or aquatic mammal. The trophic level at which concentration of pesticides will be maximum is tertiary level. Pesticides are non-biodegradable chemicals and they remain in the foodchain. They travel into the body of the organisms from the lower trophiclevel to the highest trophic level. As tertiary trophic level is the highest and they are the last consumers of food chain so the accumulation of pesticides will be maximum here.	3
29	i) prevents entry of food in trachea. ii) helps in exchange of gases iii) prevents collapsing of trachea when there is less air in it. OR a) It is the passage of the same blood twice through the heart , first on the right side and then on the left side in order to complete one cycle. b) i) Ensures quick and efficient supply of oxygenated blood to all body parts for meeting the higher energy needs. ii) For thermoregulation of body in mammals.	1 1 1 1 2
30	a) More refractive index means more optical denser medium. Here refractive index of water is 1.33 and of alcohol is 1.36 $\mu_{Al} > \mu_w$. Hence alcohol is more optical denser than water.	1

	 b)μ_g=1.5 μ_d=2.42 $\mu_{dg}=\mu_d/\mu_g$=2.42/1.5=1.61	1 1
31	a) Hypermetropia b)(i)increase in focal length of eye lens (ii) shortening of eye ball. c) Convex lens	1 ½ ½ 1
32	a)Potential difference=V=3V Resistance=R= 4Ω Current=I=V/R=3/4A=0.75A b) Potential difference = 3V c) Rp= (4 x 2) / (4+2)=8/6=4/3Ω =1.33Ω Re= 0.5Ω + 1.33Ω = 1.83Ω OR a)Resistance = V/I=2/0.1=20Ω b) Total resistance = Rp=V/I= 220V/5A= 44Ω Resistance=R=176Ω n=number of resisters = R/Rp=176Ω/44Ω =4	1 1 1 1 1 1
33	(a)The cake will taste bitter due to formation of sodium carbonate. (b)Tartaric acid should be added to baking soda to convert it into baking powder. (c)Tartaric acid neutralizes sodium carbonate formed and will not make the taste bitter.	3

	SECTION - D	
34	a) it will turn milky. On passing in excess the milkiness disappear. b) In test tube A $Na_2CO_3 + 2CH_3COOH \rightarrow 2CH_3COONa + H_2O + CO_2$ In Test tube B $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$ c) No reaction occur d) The lime water is prepared by dissolving calcium oxide in water and decanting the supernatant liquid. The reaction is referred to as slaking of lime OR a) Hydrogenation is defined as the reaction between hydrogen and other compounds in the presence of a catalyst. Hydrogenation can also be defined as the addition of hydrogen to an element or a compound.  b)   d)  e)Combustion reactions are basically oxidation reactions carried in the presence of air or oxygen $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$	1 1 2 1 1 1 1
35	Fig 8.7 ,pg 134(NCERT BOOK) Function of anther- store the pollen grains Function of stigma- To trap the pollen grains OR a) i) transports food and oxygen to the growing embryo ii) transports waste products from the growing embryo to the mother's body. b) i) Mechanical barrier --- condom, cervical cap ii) Hormonal method--- oral pills, Implants like copper –T, I- pill	3 2 2 3

	iii) Surgical method ----tubectomy, vasectomy	
36	a) (i) DC (ii) AC b)(i) cell, (b) AC generator c) 50 Hz d) (i) Magnitude of DC is constant but magnitude of AC is varying. (ii) DC is unidirectional but ac changes its direction after a fixed period. e) AC can be transmitted by changing it at high voltage with the help of transformer to minimize loss in transmission.	1 1 1 1 1
	SECTION - E	
37	a) Gold, Platinum b) Cinnabar (HgS) and Zinc blende (ZnS) c) $2Cu_2S + 3O_2 \rightarrow 2Cu_2O + 2SO_2$ $2Cu_2O + Cu_2S \rightarrow 6Cu + SO_2$ OR $2HgS + 3O_2 \rightarrow 2HgO + 2SO_2$ $2HgO \rightarrow 2Hg + O_2$	1 1 2 2
38	a) dwarf plants as dwarf is a recessive gene. b) All are tall plants. c) Phenotypic ratio =3:1, 3 tall and 1 dwarf OR Genotypic ratio= 1:2:1, 1 pure tall, 2hybrid tall and 1 pure dwarf	1 1 2 2
39	(a) Both Concave mirrors and Convex mirrors (b) R_1= 17.5 cm, R_2= 10.5 cm f=R/2 $f_1/f_2=(R_1/2)/(R_2/2)=17.5/10.5=5:3$ (c) Magnification=+4 m=-v/u=+4	1 1 2

	Image distance = 36 cm Object distance=-v/+4=-(36/4)= -9 cm OR virtual, erect , diminished and behind the mirror	2

SCIENCE (086)
CLASS X
Sample Question Paper -5 (2022-23)

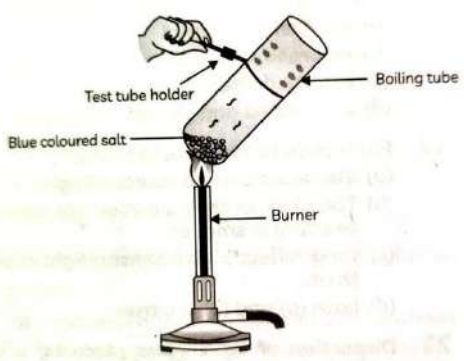
Max. Marks: 80 **Time Allowed: 3** Hours

General Instructions:

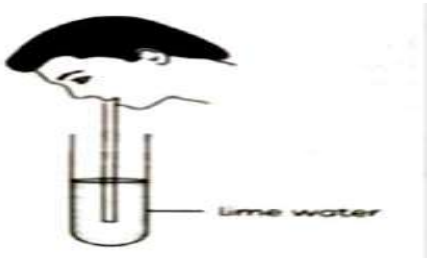
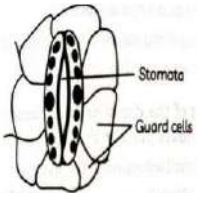
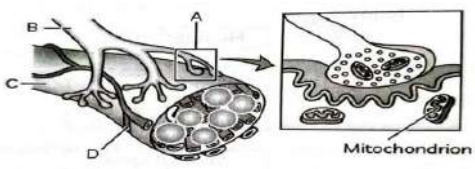
i. *This question paper consists of 39 questions in 5 sections.*
ii. *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
iii. ***Section A** consists of 20 objective type questions carrying 1 mark each.*
iv. ***Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.*
v. ***Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words*
vi. ***Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*
vii. ***Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

SECTION - A

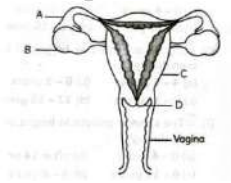
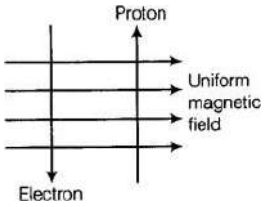
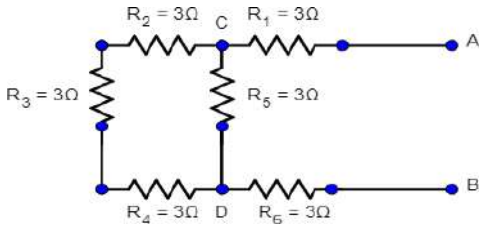
Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

Q. No	Questions	Marks
1	A blue colour salt turns white when heated but regains its blue colour when moistened with water as shown in figure below. The salt is  (a) $FeSO_4.7H_2O$ (b) $CuSO_4.5H_2O$ (c) $Na_2CO_3.10H_2O$ (d) $CaSO_4.2H_2O$	1

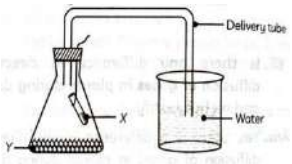
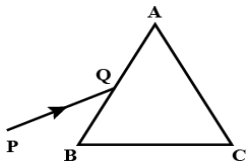
2	Limestone $\xrightarrow[step-1]{heated}$ X + CO_2 X + H_2O $\xrightarrow{step-2}$ slaked lime Identify the correct options from the given table which represents the type of reactions occurring in step-1 and step-2 Endothermic / Exothermic (a) X / ✓ (b) ✓ / X **(c)** ✓ / ✓ (d) X / X	1
3	Reema took 5ml of lead nitrate solution in a beaker and added approximately 4ml of potassium iodide solution to it. What would she observe? (a) The solution turns red (b) Yellow precipitate was formed (c) White precipitate was formed (d) The reaction mixture became hot	1
4	The solution of a substance X changes its colour to pink when phenolphthalein is added to it. Solution of another substance Y changes its colour to yellow on adding methyl orange. Identify the correct nature of solution of X and Y. (a) Both X and Y are basic (b) X is basic and Y is acidic (c) X is acidic and Y is basic (d) Both X and Y are acidic	1
5	What will be the genotypic and phenotypic ratio of the cross between Rr and rr respectively (R is dominant allele and r is recessive allele)? (a) 1:2:1 and 3:1 (b) 1:2:1 and 1:1 (c) 1:1 and 3:1 (d) 1:1 and 1:1	1
6	The pH value of which of the following salts is greater than 7? (i) Sodium Carbonate (ii) Sodium chloride (iii) Sodium Sulphate (iv) Sodium hydrogen carbonate (a) Both (i) and (ii) (b) Both (ii) and (iv) (c) Both (i) and (iii) (d) Both (i) and (iv)	1

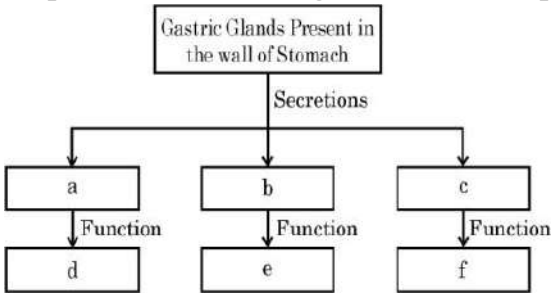
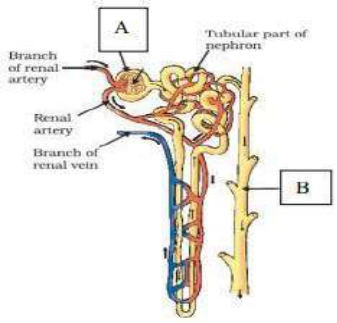
7	Why is catenation tendency maximum in case of carbon? (a) Because C-H bond is very strong (b) Because ~~C-C~~ bond is very strong (c) Because C-C bond is very weak (d) Carbon has very large size	1
8	Observe the diagram of an activity given. What does it help to conclude, when the person exhales into the test-tube?  (a) Percentage of carbon dioxide is more in inhaled air. (b) Fermentation occurs in the presence of oxygen. (c) Percentage of carbon dioxide is more in the exhaled air. (d) Fermentation occurs in the presence of carbon dioxide.	1
9	Which one of the following conditions is true for the state of stomata of a green leaf shown in the given diagram?  (a) Large amount of water flow into the guard cells. (b) Gaseous exchange is occurring in large amount. (c) Large amount of water flows out from the guard cells. (d) Large amount of sugar gets collected in the guard cells.	1
10	Why is sodium metal never left open in air? (a) It melts at room temperature (b) It reacts with moisture present in air (c) It reacts violently with oxygen present in air (d) Both (b) and (c) are correct	1
11	Look at the figure below and identify the structure labeled incorrectly:  	1

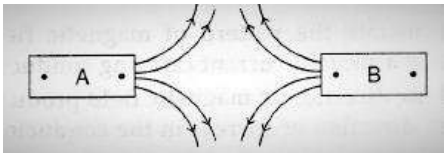
(a)	A	Neuromuscular junction
(b)	B	Axon
(c)	C	Muscle fibre
(d)	D	Dendrite

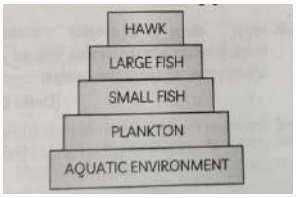
12	Refer to the diagram of female reproductive system:  The correct labeling of parts A, B, C and D is: (a) A: Oviduct, B: Ovary, C: Uterus, D: Cervix (b) A: Oviduct, B: Fallopian Tube, C Ovary, D: Uterus (c) A: Fallopian Tube, B: Uterus, C: Ovary D: Cervix (d) A: Oviduct, B: Ovary, C: Cervix, D: Uterus	1
13	For a fixed supply voltage the current flowing through a conductor will decrease when (a) The cross- sectional area of the conductor is increased (b) The length of the conductor is increased (c) The length of the conductor is decreased *(d)* The cross-sectional area is increased and length is decreased.	1
14.	A uniform magnetic field exists in the plane of paper pointing from left to right as shown in the figure. In the field, an electron and a proton move as shown. The electron and the proton experience:  	1
	(a) forces both pointing into the plane of paper (b) forces both pointing out of the plane of paper (c) forces pointing into the plane of paper and out of the plane of paper, respectively. (d) forces pointing opposite and along the direction of the uniform magnetic field respectively.	
15	Find the equivalent resistance between A and B given in the circuit given below?  (a) 18Ω (b) 4 Ω (c) 8.25 Ω (d) 7.2 Ω	1

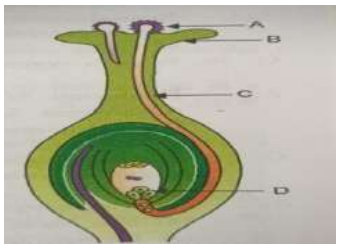
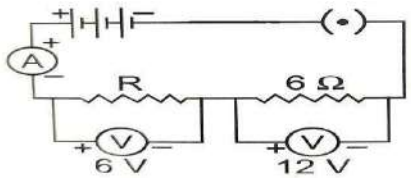
16	A current carrying conductor is held in vertical direction. In order to produce a clockwise magnetic field around the conductor, the current should be passed in the conductor: (a) From top to bottom (b) From left to right (c)From bottom to top (d) From right to left	1
Q. no 17 to 20 are Assertion - Reasoning based questions. These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true and R is not the correct explanation of A (c) A is true but R is false (d) A is False but R is true		
17	**Assertion (A):**Most reactive metals react with dilute acids to liberate hydrogen gas. **Reason(R):** Very few reactive metals react with bases to liberate hydrogen gas	1
18	**Assertion (A):** The sex of a child in human beings will be determined by the type of chromosome he/ she inherits from the father. **Reason (R):** A child who inherits 'X' chromosome from his father would be a girl (XX), while a child who inherits a 'Y' chromosome from the father.	1
19	**Assertion (A):** The average hemoglobin levels in newborns is higher than adults. **Reason (R):**Newborns have lower oxygen levels in the womb and need less red blood cells to transport the oxygen	1
20	**Assertion (A):** Strength of an electromagnet can be increased by increasing the number of turns per unit length in solenoid coil. **Reason (R)**: Strength of an electromagnet can be increased by increasing the current flowing through the solenoid	1

	SECTION – B Q. no. 21 to 26 are very short answer questions.	
21	Lead nitrate solution is added to a test tube containing potassium iodide solution. (a) Write the name and colour of the compound precipitated. (b) Write the balanced chemical equation for the reaction involved. OR A compound 'A' is used in the manufacture of cement. When dissolved in water, it evolves a large amount of heat and forms compound 'B'. (i) Identify A and B. (ii) Write chemical equation for the reaction of A with water	2
22	A cheetah, on seeing a prey, moves towards him at a very high speed. What causes the movement of his muscles? How does the chemistry of cellular components of muscles change during this event?	2
23	In the experimental set-up shown below, (a) Name the material X filled in the small test tube and the material Y placed at the bottom of the conical flask. (b)Why is there a rise in water level in the delivery tube?  	2
24	State two benefits of having four chambered heart in aves and mammals.	2
25	A narrow beam PQ of blue light is passing through a glass prism ABC as shown in the diagram. Trace it on your answer sheet and show the path of the emergent beam of light. Write the name and cause of the phenomenon observed.  OR How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prismas white light? Draw the diagram.	2

26	In what two ways are the organisms occupying the highest tropic level at a disadvantage as compared to the organisms of the lower tropic level?	2
	SECTION - C Q.no. 27 to 33 are short answer questions.	
27	Mention with reason the colour changes observed when (a) silver chloride is exposed to sunlight (b) Copper powder is strongly heated in the presence of Oxygen (c) A piece of zinc is dropped in copper sulphate solution. Give chemical equation.	3
28	In an industrial process used for the manufacture of sodium hydroxide, a gas A is formed as a by-product. The gas A reacts with lime water to give a compound B which is used as a bleaching agent in chemical industry. Identify A and B. Also give the reactions involved.	3
29	Complete the following flow chart as per the given instructions  OR  (a) Identify A and B (b) Name two substances get selectively reabsorbed by the tubular part of the nephron. (c) How is the amount of urine produced regulated?	3

30	(a) A real image of size one third of the size of the object is formed by a mirror as well as by a lens. Name the nature of the lens and the mirror. (b) The velocity of light in medium A is 3/4 times the velocity of light in vacuum. Find the refractive index of medium A. (c) If an image of magnification -1 is to be obtained using a concave mirror of focal length 6 cm, then find the position of the object.	3
31	The image of a candle flame placed at a distance of 30 cm from a spherical lens is formed on a screen placed on the other side of the lens at adistance of 60 cm from the optical centre of the lens. Identify thetype of lens, calculate its focal length and power. If the height of the flame is 3 cm, find the height of its image.	3
32	Explain whether an alpha particle experience any force in a magnetic field, if (a) it is placed in the field at rest. (b) it moves in the magnetic field parallel to field lines. (c) it moves perpendicular to field lines. OR (a) Magnetic field lines of two bar magnets A and B are as shown below. Name the poles of the magnets facing each other.  (b) Two magnetic field lines never intersect each other. Give reason. (c) How does the strength of magnetic field at the centre of a current carrying circular coil depend on the: (i) radius of the coil, (ii) number of turns in the coil.	3

33	(a) DDT was sprayed in a lake to regulate breeding of mosquitoes. How would it affect the trophic levels in the following food chain associated with a lake? Justify your answer.  . (b) Calculate the amount of energy available to the organisms at the 4^{th} trophic level if the energy available to the organisms at the 2^{nd} trophic level is 2000 J.	3
	SECTION - D Q.no. 34 to 36 are Long answer questions.	
34	The formulae of four organic compounds are given below: A- C_2H_4 B- CH_3COOH C- C_2H_5OH D- C_2H_6 (a) Which of these compounds A, B, C or D is a saturated hydrocarbon? (b) Identify the organic acid and give its structural formula. (c) Which of the above compounds when heated at 443K in the presence of concentrated H_2SO_4 forms ethene as major product? What is the role played by concentrated H_2SO_4? Also write the chemical equation involved in presence (d) Give a chemical equation when B and C react with each other of concentrated H_2SO_4 . Name the major product formed and mention one of its important uses. OR A compound C (molecular formula $C_2H_4O_2$) reacts with Na-metal to form a compound R and evolves a gas which burns with a pop sound. Compound C on treatment with an alcohol A in presence of an acid forms a sweet smelling compound S (molecular formula $C_3H_6O_2$). On addition of NaOH to C, it gives R and water. S on treatment with NaOH solution gives back R and A. Identify C, R, A, S and write down reaction involved.	5

35	(a) Mention the role of the following organs of human male reproductive system: (i)Testis (ii) Scrotum (iii) Vas deferens (iv)Prostate gland. (b) What are the two roles of testosterone? OR (a) List two reasons for the appearance of variations among the progeny formed by sexual reproduction.  (b) Name the part marked 'A' in the diagram (c) How does A 'reach part "B"? (d) State the importance of part "C". (e) What happens to the part "D" after fertilization is over?	5
36	(a) A circuit is shown in the diagram given below. (i) Find the value of R.  (ii) Find the reading of the ammeter. (iii) Find the potential difference across the terminals of the battery. (b) Two lamps, one rated 100W at 220V and the other 60W at 220V, are connected in parallel to the electric supply at 220V. (i) Compare their resistance and calculate the total resistance in the circuit. (ii) Calculate the current drawn from the electric supply.	5
SECTION - E Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.		

37	Iqbal treated a lustrous, divalent element M with Sodium Hydroxide. He observed the formation of bubbles in reaction mixture. He made the same observations when this element was treated with hydrochloric acid. (a) Suggest how can he identify the produced gas. (b)Identify M. (c)Write chemical equations for both reactions. OR (c)Give one example of a trivalent metal which forms amphoteric oxide. Write equations to support your answer.	4
38	Sahil performed an experiment to study the inheritance pattern of genes. He crossed tall pea plants (TT) with short pea plants (tt) and obtained all tall plants in F_1 generation. (a) What will be the set of genes present in the F_1 generation? (b) Give reason, why only tall plants are observed in F_1 progeny. (c) When F_1 plants were self-pollinated, a total of 800 plants were produced. How many of these would be tall and short plants? Give the genotype of F_2 generation. **OR** (c) When F_1 plants were cross-pollinated with plants having tt genes, a total of 800 plants were produced. How many of these would be tall and short plants? Give the genotype of F_2 generation.	4

39	A simple microscope is an optical instrument that magnifies the size of the tiny objects. It consists of a lens of small focal length.The image of the tiny object is formed at the least distance of distinct vision from the eye held close to the lens. The simple microscope is also called a magnifying glass.  (a) Based on the data given in the above paragraph, what kind of lens must the simple microscope have and mention the position of the object. (b) If *v* is the symbol used for image distance and *u* for object distance then with one reason state what will be the sign for v/u in the given case? (c) An object is placed at a distance of 10 cm away from a convex lens and image is formed at a distance of 30 cm atthe same side of the lens. Find the focal length of the lens. OR (c) Draw a ray diagram to show image formation in case of a simple microscope. Find the focal length of a lens of power - 2.5 D.	4

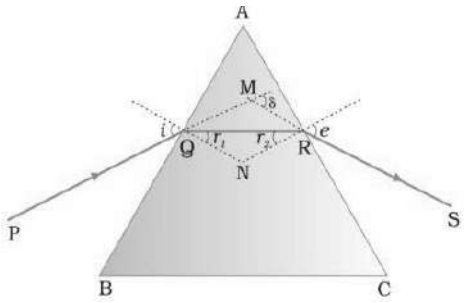
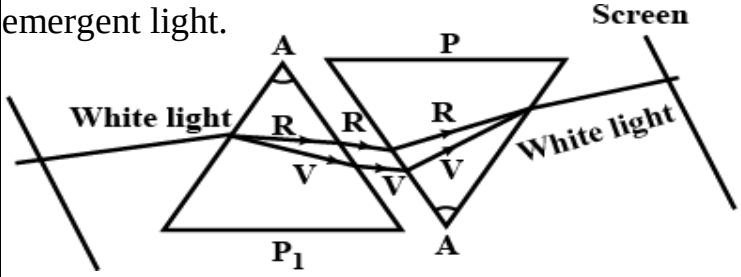
SCIENCE (086)

CLASS - X

Sample Paper - 5 (2022-23)

Marking Scheme

Q. No	**Value Points**	Marks
	SECTION – A	
1.	(b) $CuSO_4.5H_2O$	1
2.	(c)	1
3.	(b) yellow precipitate was formed	1
4.	(a) Both X and Y are basic	1
5.	(d) 1:1 and 1:1	1
6.	(d) Both (i) and (iv)	1
7.	(b) Because C-C bond is very strong	1
8.	(c) Percentage of carbon dioxide is more in the exhaled air.	1
9.	(c) Large amount of water flows out from the guard cells.	1
10.	(c)It reacts with oxygen in the presence of air violently	1
11.	(d)	1
12.	(a) A: Oviduct, B: Ovary, C: Uterus, D: Cervix	1
13.	(b) The length of the conductor is increased.	1
14.	(a) Forces both pointing into the plane of paper.	1
15.	(c) 8.25 Ω	1
16.	(a) From top to bottom.	1
17.	(b) Both A and R are true but A is not the correct explanation of A	1
18.	(a) Both A and R are true and R is the correct explanation of A	1
19.	(c) A is true but R is false	1
20.	(b) Both A and R are true and R is not the correct explanation of A.	1
	SECTION – B	
21.	(a)When lead nitrate is added to potassium iodide then yellowprecipitate of lead iodide is formed along with potassium nitrate. (b) Balanced chemical reaction is as follows : $Pb(NO_3)_{2(aq)} + 2KI_{(aq)} \longrightarrow \underset{\text{(Yellow ppt.)}}{PbI_{2(s)}\downarrow} + 2KNO_{3(aq)}$ Or (i)A is calcium oxide, CaO which is used in the manufacturing ofcement. B is calcium hydroxide $Ca(OH)_2$ (ii) $\underset{(A)}{CaO_{(s)}} + H_2O_{(l)} \longrightarrow \underset{(B)}{Ca(OH)_{2(s)}}$ 34.S is CH_3COOCH_3 (Methyl ethanoate).	2

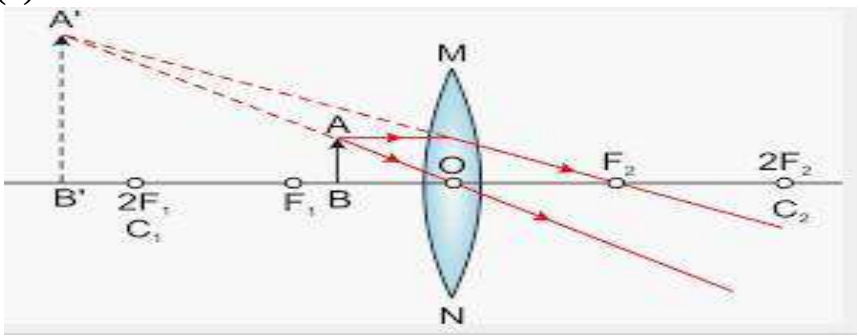
22.	A cheetah on seeing a prey generates a nerve impulse which reaches the muscles and the muscle fibre moves. The muscle cell will then move by changing their shape . Muscle cells have special proteins that change both shape and their arrangement in the cell in response to nervous electrical impulses.	2
23.	(a) X-KOH, Y-Wet germinating seeds (b) Seeds use oxygen present in the flask and release carbon dioxide which is absorbed by potassium hydroxide. Thus, partial vacuum is created in the conical flask, as a result water from the beaker rises in the delivery tube.	2
24.	- Prevents the mixing of oxygenated and deoxygenated blood - Efficient supply of oxygen to the body -help to maintain their body temperature (Any Two)	2
25.	 Refraction/ Deviation of light through a prism. It is a monochromatic ray of light (single colour), so refraction will take place. Speed of light changes when medium changes. OR Angle of deflections of the two prisms need to be equal and opposite. While the first prism splits the light in the seven colours due to different angles of deflection, the second prism combines the spectrum along a single ray and the colours again combine to give white light as the emergent light.  	1 1 1 1
26.	Organisms occupying the highest trophic level are at a disadvantage as compared to the organisms of the lower trophic levels in a food chain in the following two ways: a) they get more amount of harmful chemicals b) less amount of energy.	2

SECTION - C Q.no. 27 to 33 are short answer questions.		
27.	(i) The colour changes from white to grey due to decomposition reaction of silver chloride when exposed to sunlight. 2AgCl $\rightarrow$ 2Ag + Cl_2 (white) (grey) (ii) The colour changes from brown to black due to oxidation of copper into copper oxide. 2Cu + $O_2\rightarrow$ 2CuO (brown) (black) (iii) The colour changes from blue to colourless due to displacement reaction as zinc is more reactive than copper. Zn+$CuSO_4\rightarrow$ $ZnSO_4$ + Cu (blue) (colourless)	1 1 1
28.	A$\rightarrow$ Cl_2 ,Chlorine gas B$\rightarrow$$CaOCl_2$, calcium oxychloride 2NaCl +2$H_2O\rightarrow$2NaOH+$Cl_2 + H_2$ $Cl_2 + Ca(OH)_2 \rightarrow CaOCl_2 + H_2O$	0.5 0.5 1 1
29.	(a) Hydrochloric acid (b) Pepsin (c) Mucus (d) Functions of hydrochloric acid: HCl makes the medium acidic / Itkills the harmful bacteria present in the stomach. (e) Function of pepsin: Pepsin breaks down proteins into peptones. (f) Function of mucus: Mucus protects the inner lining of the stomach from the action of the acid under normal conditions. OR (a) A- Bowman's capsule B- Collecting duct (b) Glucose, amino acid, water, salt. (any two) (c)-amount of excess water present in the body -amount of dissolved waste to be excreted.	1.5 1.5 1 1 1
30.	(a) concave mirror and convex lens (b) n_A = c/v_A= 4c/3c = 4/3 = 1.33 (c) R=2f= 12 cm in front of the concave mirror. u= -12 cm	1 1 1

31.	Given: u = - 30cm v = 60cm h_o = +3cm , Using lens formula $\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{60} - \frac{1}{-30} = \frac{1}{60} + \frac{1}{30} = \frac{3}{60} = \frac{1}{20}$ f = 20cm The positive sign of the focal length indicates that the given lens is convex in nature whose focal length is 20 cm. Again, $h = \frac{v}{u} \times h_o = \frac{+60}{-30} \times 3 = -6$cm	3
32.	(a) No, because, a charged particle at rest does not interact with magnetic field. (b) No, because, the force is zero if current and field are in the same direction. (c) Yes, because, the force is maximum when current and magnetic field are perpendicular. OR (a) A- North pole and B- North Pole (b) If they do so, at the point of intersection, there would be two directions of magnetic field, which is not possible. (c) (i) B α 1/ r (ii) B α N	1 1 1 1 1 1
33.	(a) DDT being a non-biodegradable pesticide will enter the food chain from the first trophic level and accumulate progressively at each trophic level. This phenomenon is known as biological magnification. HAWK will have the highest level of pesticide. (b) Energy available in 3rd trophic level= 200J Energy available in 4rd trophic level= 20J	3
	SECTION - D	
34.	(a) D is a saturated hydrocarbon (b) B is an organic acid Structure --- (c) C is the compound In this reaction, H_2SO_4 acts as a dehydrating agent and removes water molecule from ethanol. $C_2H_5OH \xrightarrow{\text{hot } H_2SO_4} C_2H_4\,(\text{ethane}) + H_2O$ (d) $CH_3COOH + C_2H_5OH \xrightarrow{conc.H_2SO_4} CH_3COOC_2H_5 + H_2O$ Major product is ester. Use: In making perfumes or flavouring agent.	0.5x3 1.5 1 1

	OR C: Ethanoic acid R: Sodium acetate and gas evolved is hydrogen A: Methanol S: Ester (methyl acetate) (i) $2CH_3COOH + 2Na \rightarrow 2CH_3COONa + H_2$ (ii) $CH_3COOH + CH_3OH \rightarrow CH_3COOCH_3 + H_2O$ (iii) $CH_3COOH + 2NaOH \rightarrow CH_3COONa + H_2O$ (iv) $CH_3COOCH_3 + 2NaOH \rightarrow CH_3COONa + CH_3OH$	0.5x4 3
35.	(a)(i)Testis. Produces sperms and hormone testosterone. (ii) Scrotum. Holding the two testes outside the abdominal cavity for providing optimum temperature (2°C less than body temperature) for sperm maturation. (iii) Vas Deferens- Passage of sperms from epididymis to ejaculatory duct. (iv) Prostate Gland- Secretes nutritive fluid for activation of sperms (b) -Testosterone Regulates sperm formation - puberty changes in boys OR (a)- Traits of the two parents are involved. -Reshuffling of chromosomes and crossing over. - Error in DNA copying. (b) Pollen grain. (c) Pollen grains are carried to stigma by the agency of wind, water or insects in the process of pollination. (d) It is pollen tube formed on germination of pollen grain. The same carries male gametes to the female gamete. (e) After fertilization the ovary is converted into fruit.	3 2 1x5
36.	a) (i) I= V/R=12V/6 Ω =2A R=6 V/2A= 3 Ω (ii) Reading of ammeter = 2A (iii) PD across the terminals of the battery = $R_S I$ = 9Ω X 2A= 18V (b) (i) Resistance of 100W lamp, $R_1 = V^2/P$ $= \frac{220 \times 220}{100} = 484\ \Omega$ Resistance of 60W lamp, $R_2 = V^2/P$ $= \frac{220 \times 220}{60} = \frac{2420}{3}\ \Omega$ 60W lamp has higher resistance. $\frac{1}{R} = \frac{1}{484} + \frac{3}{2020} = \frac{8}{2420}$	0.5x2 1 3

	$R = \frac{2420}{8}\ \Omega$ $1 = \frac{V}{I} = \frac{220\ X\ 8}{2420} = 0.73\ \Omega$	
	SECTION - E	
37.	(a) When a burning splinter is brought near the gas, it burns with a pop sound. (b) M is zinc (c) 2Zn+2NaOH→$Na_2ZnO_2 + H_2$(g) Zn+2HCl→$ZnCl_2 + H_2(g)$ OR Al_2O_3 + 6HCl → 2$AlCl_3$ + H_2O Al_2O_3 + 2$NaOH$ → 2$NaAlO_2$ + H_2O	1 1 2 2
38.	(a) Tt (b) Traits like 'T' are called dominant traits, while those that behave like 't' are called recessive traits (c) Out of 800 plants 600 plants will be tall and 200 plants will be small 1 TT: 2Tt: 1tt OR (c) In the cross between Tt x tt, 400 Tall (Tt) and 400 short (tt) plants will be produced. 1Tt: 1tt	1 1 2 2
39.	(a) Convex Lens & Between F and O (b) Positive as the image is virtual and erect. (c) 1/f= 1/v- 1/u Or 1/f = (-1/30) + (1/10) Or 1/f =(-1 +3)/30 = 2/30 = 1/15 f =15 cm	1 1 2

	OR (c)  (1 marks) f= 1/p =-1/2.5 =-2/5 =-0.4 m= -40 cm (1 marks)	2

SCIENCE (086)
CLASS-X
Sample Question Paper -6 (2022-23)

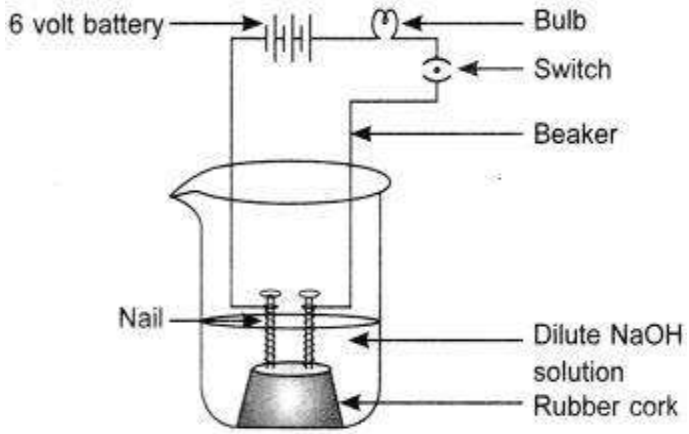
Max. Marks: 80 **Time Allowed: 3 Hours**

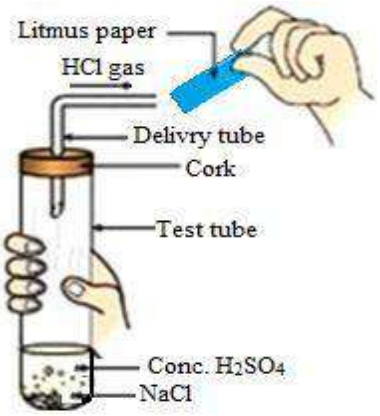
General Instructions:

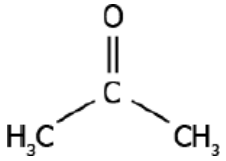
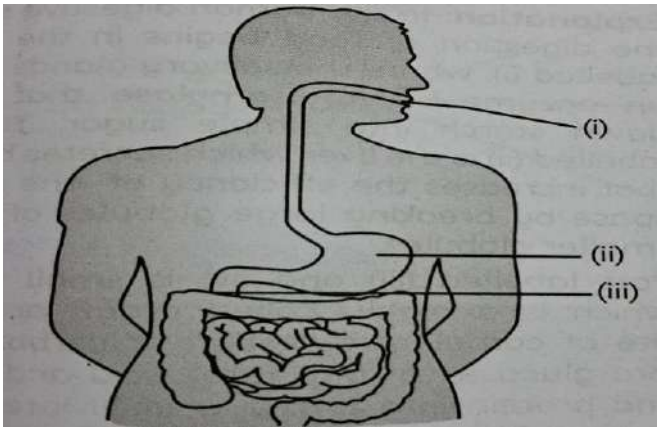
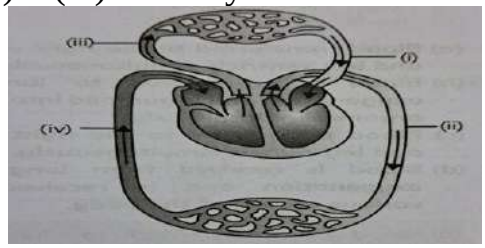
i. This question paper consists of 39 questions in 5 sections.
ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
iii. **Section A** consists of 20 objective type questions carrying 1 mark each.
iv. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answer to these questions should in the range of 30 to 50 words.
v. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answer to these questions should in the range of 50 to 80 words.
vi. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
vii. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

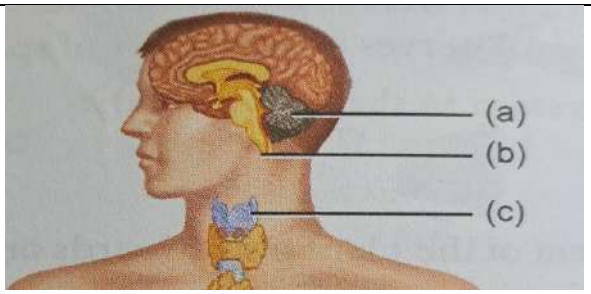
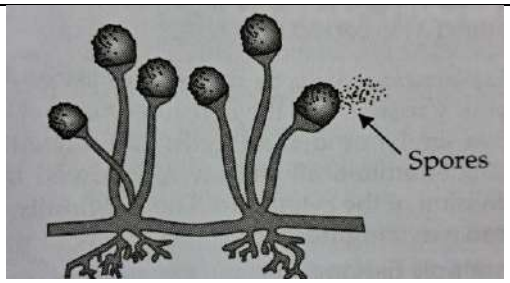
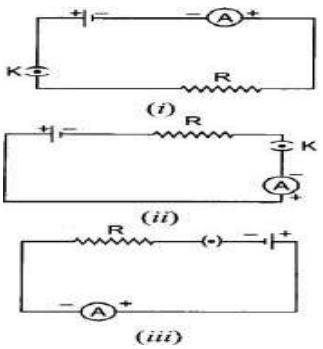
SECTION - A

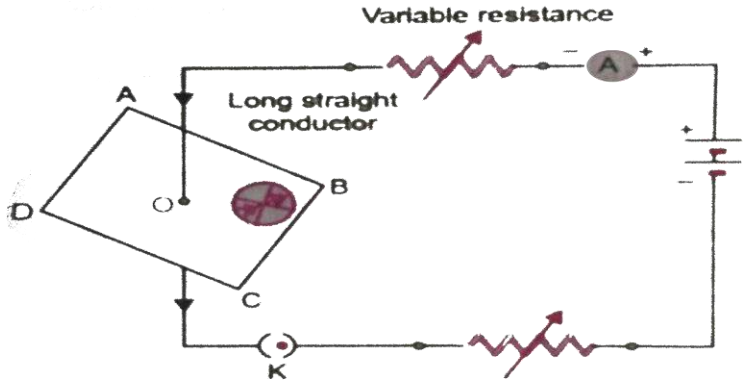
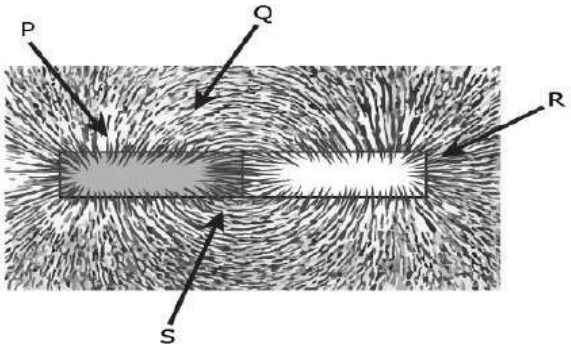
Select and write one most appropriate option out of the four options given for each of the questions 1 - 20

1	The apparatus given in the adjoining figure was set up to demonstrate electrical conductivity.  Which of the following statement(s) is (are) correct? (i) Bulb will not glow because electrolyte is not acidic. (ii) Bulb will glow because NaOH is a strong base and furnishes ions for conduction. (iii) Bulb will not glow because circuit is incomplete. (iv) Bulb will not glow because it depends upon the type of electrolytic solution. (a) (i) and (iii) (b) (ii) and (iv) (c) (ii) only (d) (iv) only	1

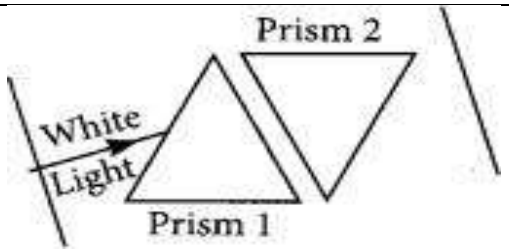
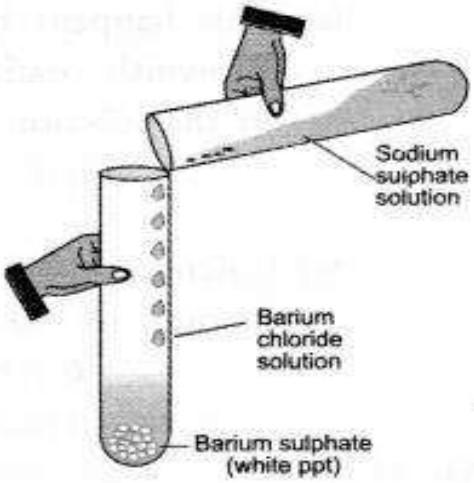
2	The chemical reaction between Hydrogen sulphide and iodine to give Hydrogen iodide and sulphur is given below: $H_2S + I_2 \rightarrow 2HI + S$ The reducing and oxidizing agents involved in this redox reaction are: (a) Iodine and sulphur respectively (b) Hydrogen sulphide and Iodine respectively (c) Sulphur and iodine respectively (d) Hydrogen sulphide and sulphur	1
3	The correct general representation for the displacement reaction is : (a) A + B $\longrightarrow$ AB (b) AB $\longrightarrow$ A + B (c) AB + CD $\longrightarrow$ AC + BD (d) AB + C $\longrightarrow$ AC + B	1
4	 Blue litmus paper is brought near the mouth of the delivery tube to check the presence of HCl acid but no change is observed in the color of litmus paper because: (a) The litmus paper used is dry (b) The litmus paper used is moist (c) Blue litmus paper does not change its color with an acid (d) The litmus paper is kept very close to the mouth of the delivery tube.	1
5	Reaction between X and Y forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z? (a) Has high melting point (b) Has low melting point (c) Conducts electricity in molten state (d) Occurs as solid	1
6	You are given 3 unknown solutions with pH value as 6, 8 & 9.5 respectively. Which solution will contain maximum OH^- ion? (a) Solution sample-1 (b) Solution sample-2 (c) Solution sample-3 (d) Data are insufficient	1

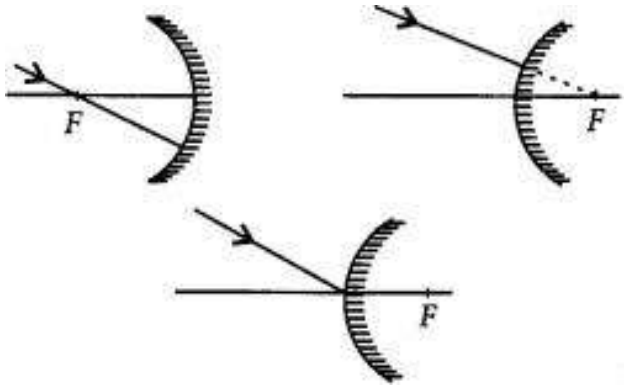
7	The image represents a carbon compound.  Which functional group is present in the compound? (a) alcohol (b) aldehyde (c) carboxylic acid (d) ketone	1
8	Identify the option that indicates the correct enzyme that is secreted in location (i), (ii) and (iii).  (a) (i) lipase, (ii) trypsin, (iii) pepsin (b) (i) amylase, (ii) pepsin, (iii) trypsin (c) (i) trypsin, (ii) amylase, (iii) pepsin (d) (i) amylase, (ii) trypsin, (iii) pepsin	1
9	The figure given below shows a schematic plan of blood circulation in humans with labels (i) to(iv). Identify the correct level with it its functions.  (a) (i) Pulmonary vein takes impure blood from body part. (b) (ii) Pulmonary artery takes blood from lung to heart. (c) (iii) Aorta takes blood from heart to body parts. (d) (iv) Vena cava takes blood from body parts to right auricle.	1
10	The maleness of a child is determined by (a) The X chromosome in the zygote. (b) The Y chromosome in the zygote. (c) The cytoplasm of germ cell which determines the sex. (d) Sex is determined by chance.	1

11	 Identify the endocrine gland labelled as (c) in the above figure. (a) Pineal gland (b) Pituitary gland (c) Thyroid gland (d) Adrenal gland	1
12	 The above diagram shows: (a) Spore formation in Rhizopus. (b) Fragmentation in Spirogyra. (c) Binary fission in Amoeba. (d) Spore formation in Yeast.	1
13	A cell, a resistor, a key, and an ammeter are arranged as shown in the circuit diagrams.  The current recorded in the ammeter will be (a) maximum in (i) (b) maximum in (ii) (c) maximum in (iii) (d) same in all the cases	1
14	If the key in the given arrangement is taken out (the circuit is made open) and magnetic field lines are drawn over the horizontal plane ABCD, the lines are	1

	 (a) concentric circles (b) elliptical in shape (c) straight lines parallel to each other (d) concentric circles near the point O but of elliptical shapes as we go away from it	
15	Conventionally, the direction of the current is taken as (a) the direction of flow of negative charge (b) the direction of flow of atoms (c) the direction of flow of molecules (d) the direction of flow of positive charge	1
16	A student places some iron filings around a magnet. The iron fillings arrange themselves as shown in the image.  The student labelled four different regions around the magnet. Where would the magnetic field be the strongest? (a) P (b) Q (c) R (d) S	1
	Q. no 17 to 20 are Assertion -Reasoning based questions. **These consist of two statements –Assertion (A) and Reason (R).** **Answer these questions selecting the appropriate option given below:** **(a) Both A and R are true and R is the correct explanation of A** **(b) Both A and R are true and R is not the correct explanation of A** **(c) A is true but R is false** **(d) A is False but R is true**	
17	Assertion (A) : Photosynthesis is considered as an endothermic reaction. Reason(R): Energy gets released in the process of photosynthesis.	1
18	Assertion (A): In humans, males play an important role in determining the sex of the child.	1

<table>
<tr><td></td><td>Reason(R): Males have two X chromosomes.</td><td></td></tr>
<tr><td>19</td><td>Assertion (A): Energy is used in the process of respiration.
Reason (R): Respiration stores energy in the form of ATP.</td><td>1</td></tr>
<tr><td>20</td><td>Assertion (A): On changing the direction of flow of current through a straight conductor, the direction of a magnetic field lines around the conductor is reversed.
Reason (R): The direction of magnetic field lines around a conductor can be given in accordance with left hand thumb rule.</td><td>1</td></tr>
<tr><td></td><td>SECTION -B
Q.no. 21 to 26 are very short answer questions.</td><td></td></tr>
<tr><td>21</td><td>Fill the missing data in the following table:
<table><tr><th rowspan="2">Name of the salt</th><th rowspan="2">Formula of salt</th><th colspan="2">Constituting</th></tr><tr><th>Base</th><th>Acid</th></tr><tr><td>1. Ammonium chloride</td><td>NH_4Cl</td><td>NH_4OH</td><td>—</td></tr><tr><td>2. Copper sulphate</td><td>—</td><td>—</td><td>H_2SO_4</td></tr><tr><td>3. Sodium chloride</td><td>NaCl</td><td>NaOH</td><td>—</td></tr><tr><td>4. Magnesium nitrate</td><td>$Mg(NO_3)_2$</td><td>—</td><td>—</td></tr></table>OR
A compound P forms the enamel of teeth. It is the hardest substance of the body. It doesn’t dissolve in water but gets corroded when the pH is lowered below 5.5.
(a) Identify the compound P.
(b) How does it undergo damage due to eating chocolate and sweets?</td><td>2</td></tr>
<tr><td>22</td><td>Mention the part of the body where gustatory and olfactory receptors are located.</td><td>2</td></tr>
<tr><td>23</td><td>Why and how does water enter continuously into the root xylem?</td><td>2</td></tr>
<tr><td>24</td><td>Anaerobic respiration occurs in both Yeast cells and human muscles. Mention the difference in this process in both cases.</td><td>2</td></tr>
<tr><td>25</td><td>An old person is unable to see clearly nearby objects as well as distant objects.
(a) What defect of vision is he suffering from?
(b)What kind of lens will be required to see clearly the nearby as well as distant objects? Give reasons?
OR
(a) State the relation between colour of scattered light and size of the scattering particle.
(b) Complete the path of white light when it passes through two identical Prisms placed as shown.</td><td>2</td></tr>
</table>

		
26	In a lake, water is contaminated with pesticides, which one of the following organisms, living in the lake will contain the maximum amount of pesticide and why? Small fish, zooplankton, big fish and phytoplankton.	2
	SECTION -C **Q.no. 27 to 33 are short answer questions.**	
27	Observe the given figure and answer the following questions.  (a) Write the complete balanced equation for the reaction that takes place. (b) Name the type of reaction involved. (c) If any precipitate is formed, write the colour of the precipitate.	3
28	A compound which is prepared from gypsum has the property of hardening when mixed with proper quantity of water. (i) Identify the compound. (ii) Write the chemical equation for its preparation. (iii) Mention one important use of this compound.	3
29	(i) Define transpiration. (ii) Describe briefly the role of transpiration in transportation. (iii) In which type of conducting tissues unidirectional flow of water takes place? **OR** What do you understand by translocation? Briefly describe the process.	3
30	(a) An object is placed at a distance of 20 cm from a concave mirror. Calculate the magnification of the image of the object placed perpendicular to the principal axis of the mirror of focal length 15 cm. (b) Draw the following diagram in which a ray of light is incident on a concave/convex mirror, on your answer sheet. Show the path of this ray, after reflection, in each case.	3

		
31	(a) Write the cause of advance sunrise and delayed sunset. Draw a labelled diagram to explain these phenomena. (b) Define Tyndall effect.	3
32	(a) Define solenoid. Draw magnetic field lines showing the magnetic field inside and outside the current-carrying solenoid. (b) Imagine that you are sitting in chamber with your back to one wall. An electron beam, moving horizontally from back wall towards the front wall, is deflected by a strong magnetic field to your right side. What is the direction of magnetic field? **OR** List three methods of producing a magnetic field.	3
33	How is ozone layer formed? State its importance to all life forms on earth. Why the amount of ozone in the atmosphere dropped sharply in the 1980s?	3
	SECTION -D **Q.no. 34 to 36 are very short answer questions.**	
34	(a) Write the chemical formula and name of the compound which is the active ingredient of all alcoholic drinks. List its two uses. (b) Write chemical equation and name of the product formed when this compound reacts with (i) sodium metal (ii) hot concentrated sulphuric acid **OR** (a) Define the term 'isomers'. (b) Draw two possible isomers of the compound with molecular formula C_3H_6O and write their names. (c) Write the molecular formula of the following compounds and draw their electron-dot structures: (i) Ethane (ii) Ethene	5
35	Give reasons to the following when the following events happen: (a) Testosterone is released in the male reproductive system. (b) Pollen grain falls on the stigma of flower. (c) Egg fuses with the sperm cell. (d) A Planaria is cut into three different pieces. (e) Buds are formed on the notches of leaf of the Bryophyllum. OR (a) Draw human female reproductive system and level the following parts	5

	and mention the function of each: (i) Ovary (ii) Fallopian tube (iii) Uterus (b) Describe the structure and functions of placenta.	
36	(a) Define electric resistance of a conductor. (b) List two factors on which resistance of a conductor depends. (c) Resistance of a metal wire of length 1 m is 104 Ω at 20° C. If the diameter of the wire is 0.15 mm, find the resistivity of the metal at that temperature.	5
	SECTION -E **Q.no. 37 to 39 are case -based/data -based questions with 2 to 3 short sub -parts. Internal choice is provided in one of these sub-parts.**	
37	The metals in the middle of the activity series such as iron, zinc, lead, copper, etc., are moderately reactive. These are usually present as sulphides or carbonates in nature. It is easier to obtain a metal from its oxide, as compared to its sulphides and carbonates. Therefore, prior to reduction, the metal sulphides and carbonates must be converted into metal oxides. The sulphide ores are converted into oxides by roasting and the carbonate ores are changed into oxides by calcination. (a) Define Calcination? (b) A metal that exists as a liquid at room temperature is obtained by heating its sulphide in the presence of air. Identify the metal and its ore (c) Write only the chemical equations how is copper extracted from its sulphide ore. **OR** (c) The reaction of iron (III) oxide [Fe_2O_3] with heated aluminium is used to join cracked machine parts. Give reason to the statement and write the chemical equations for this.	4
38	A green stem rose plant denoted by GG and a brown stem rose plant denoted by gg are allowed to undergo a cross with each other. It was observe in the F_2 generation that out of 100 Rose plants, 75 Rose plants have the green stem. (a) Mention the colour of stem in their F_1 progeny and percentage of brown stem plants in F_2 progeny. (b) Calculate the ratio of GG and Gg in the F_2 progeny. (c) For listing your observations show a cross. **OR** (c) Based on findings of this cross what conclusion can be drawn?	4
39	The spherical mirror forms different types of images when the object is placed at different locations. When the image is formed on the screen, the image is real and when the image does not form on-screen, the image is virtual. When the two reflected rays meet actually, the image is real and when they appear to meet, the image is virtual. A concave mirror always forms a real and inverted image for different positions of the object. But if the object is placed between the focus and pole, the image formed is virtual and erect. Various objects that we see around like vehicle headlights, shaving mirrors, solar furnaces,	4

search lights, torches, flashlights, and so on. All these objects have a concave mirror.

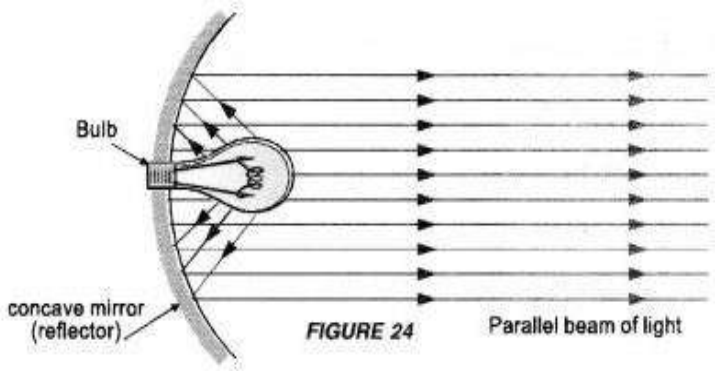


FIGURE 24

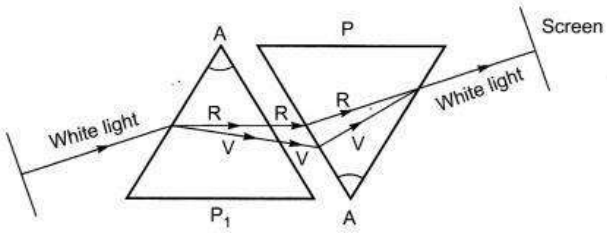
(a) State the nature of this mirror and reason for its use in the instrument used by dentist.
(b) Define the principal focus of a concave mirror.
(c) List two possible ways in which a concave mirror can produce a magnified image of an object placed in front of it. State the difference if any between these two images.

OR

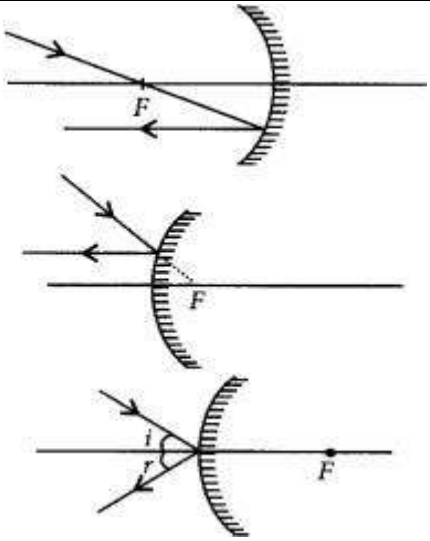
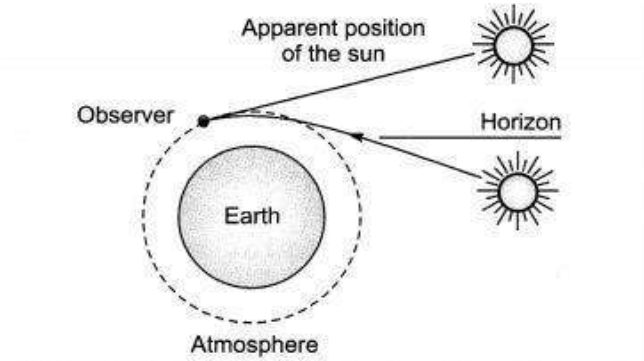
(c) A student wants to project the image of a candle flame on a screen 48 cm in front of a concave mirror by keeping the flame at a distance of 12 cm from its pole. Draw ray diagram to show the image formation in this case.

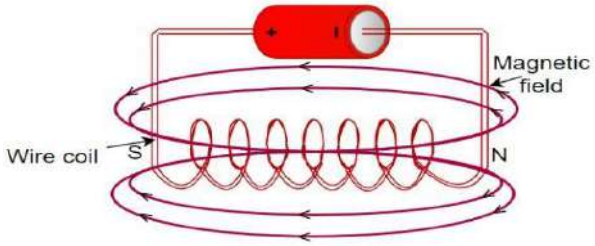
SCIENCE (086)
CLASS X
Sample Paper – 6 (2022-23)
Marking Scheme

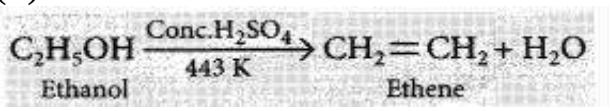
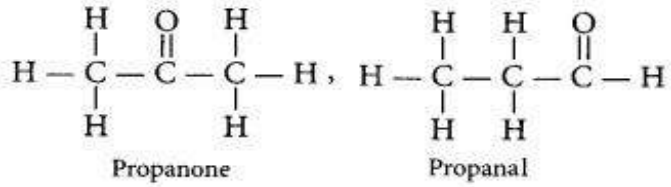
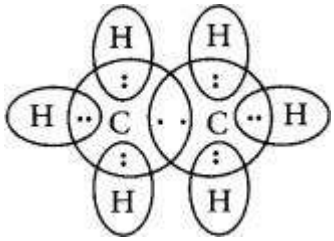
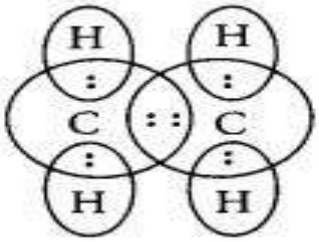
Q. NO.	Questions	Marks
	SECTION -A	
1	(c) (ii) only	1
2	(b) Hydrogen sulphide and Iodine respectively	1
3	(d) AB + C ⟶ AC + B	1
4	(a) The litmus paper used is dry	1
5	(b) Has low melting point.	1
6	(c) Solution sample-3	1
7	(d) ketone	1
8	(b) (i) amylase, (ii) pepsin, (iii) trypsin	1
9	d) (iv) Vena cava takes blood from body parts to right auricle.	1
10	b) the Y chromosome in the zygote.	1
11	(c) Thyroid gland	1
12	(a) Spore formation in Rhizopus.	1
13	(d) same in all the cases	1
14	(c) straight lines parallel to each other.	1
15	(d) the direction of flow of positive charge	1
16	(c) R	1
17	(c) A is true but R is false.	1
18	(c) A is true but R is false.	1
19	(d) A is False but R is true.	1
20	(c) A is true but R is false.	1
	SECTION -B	
21	<table><tr><th rowspan="2">Name of the salt</th><th rowspan="2">Formula of salt</th><th colspan="2">Constituting</th></tr><tr><th>Base</th><th>Acid</th></tr><tr><td>1. Ammonium chloride</td><td>NH_4Cl</td><td>NH_4OH</td><td>HCl</td></tr><tr><td>2. Copper sulphate</td><td>$CuSO_4$</td><td>$Cu(OH)_2$</td><td>H_2SO_4</td></tr><tr><td>3. Sodium chloride</td><td>NaCl</td><td>NaOH</td><td>HCl</td></tr><tr><td>4. Magnesium nitrate</td><td>$Mg(NO_3)_2$</td><td>$Mg(OH)_2$</td><td>HNO_3</td></tr></table> **OR** (a) The compound P is calcium phosphate, (b) Eating chocolates and sweets	0.5x4

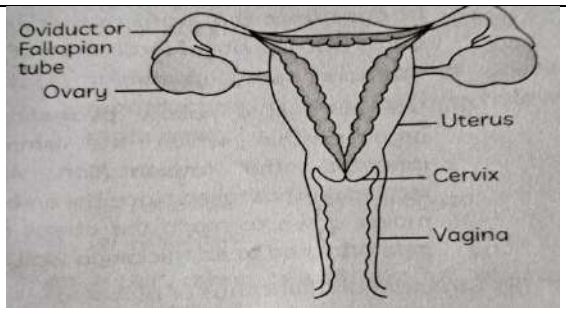
	produce large amount of acid in the mouth which is not completely neutralized by the saliva produced in the mouth. Excess acid attacks the enamel and tooth decay starts as pH of the mouth falls below 5.5.	
22	Gustatory receptors are located in tongue and olfactory receptors are located in nose.	1+1
23	Cells of root are in close contact with soil and so actively take up ions. The ion concentration increases inside the root and hence osmotic pressure increases the movement of water from the soil into the root, which occurs continuously.	1+1
24	In an yeast cell, the end products formed during fermentation are ethyl alcohol, carbon dioxide and energy. However in human muscles, the end products of anaerobic respiration are lactic acid and energy.	1+1
25	(a) Presbyopia. (b)This defect is connected by using bi-focal lens. A bi-focal lens consists of a concave lens which forms the upper surface of lens and a convex lens which form the lower surface of the lens. The upper surface enables the person to see distant objects clearly and the lower surface helps the person to see the near objects clearly. **OR** (a) The colour of scattered light depends on the size of the scattering particle. Very fine particles scatter light of short wavelengths such as blue and violet. Large size particles scatter light of longer wavelengths. (b)  	0.5 1.5 1 1
26	The concentration of pesticides will increase with the rise of tropic level in the food chain. This phenomenon is known as bio magnification. Phytoplankton →zooplankton →small fish → big fish (maximumpesticides) Therefore big fishes will have maximum amount of pesticides.	1 1
	SECTION -C	
27	(a) $BaCl_2(aq) + Na_2SO_4(aq) \longrightarrow BaSO_4(s) + 2NaCl(aq)$ (White ppt.) (b) It is a double displacement reaction. (c) The precipitate is white in colour.	1 1 1
28	(i) Plaster of Paris	1

	(ii) $CaSO_4.2H_2O \xrightarrow[373K]{\Delta} CaSO4.\frac{1}{2}H2O + \frac{3}{2}H_2O$ Gypsum Plaster of Paris (iii) It is used for plastering fractured bones.	1 1
29	(i) transpiration is loss of water in the form of water vapours from aerial parts of the plant. (ii) the loss of water in transpiration create suction which pulls water from xylem cells of roots. Thus water reaches to the upper parts of the plant by transpiration pull. (iii) xylem of plants help in upward unidirectional flow of water. **OR** The transport of soluble products of photosynthesis from the leaves to other parts of the plant is termed as translocation. Besides sugar, transportation of amino acids, hormones also takes place. The translocation of substances takes place in seive tubes with the help of adjacent companion cells in both upward and downward directions. The translocation in phloem occurs mainly by utilising energy Materials like sucrose is transferred into phloem tissue using energy in the form of ATP which increases the osmotic pressure of tissue causing water to move in the pressure then moves the material in the phloem to tissues with less pressure.	1 1 1 1.5 1.5
30	(a)Given, focal length of concave mirror, f = -15 cm Object distance, u = -20 cm Image distance, v = ? Using mirror formula, $\frac{1}{f}=\frac{1}{v}+\frac{1}{u}$ or $\frac{1}{v}=\frac{1}{f}-\frac{1}{u}=\frac{1}{-15}-\frac{1}{-20}=\frac{-4+3}{60}$ $\frac{1}{v}=\frac{-1}{60}$ or $v=-60$ cm Using magnification formula, m = –v/u = -(−60)/(−20) or m = -3 So, the magnification, m = -3. (b) The path of the rays are shown in figure.	 0.5 1

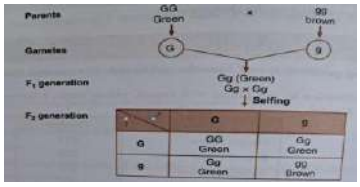
		1.5
31	(a) Advance sunrise and delayed sunset is due to atmospheric refraction. When the sun is slightly below the horizon, the sunlight coming from the less dense (vacuum) to more dense (air) medium is refracted downwards. So the sun appears to be above the horizon.  Atmospheric refraction effects at sunrise and sunset (b) Tyndall effect: The phenomenon of scattering of light by colloidal particles gives rise to Tyndall effect. Tyndall effect can be observed when sunlight passes through a canopy of a dense forest.	2 1

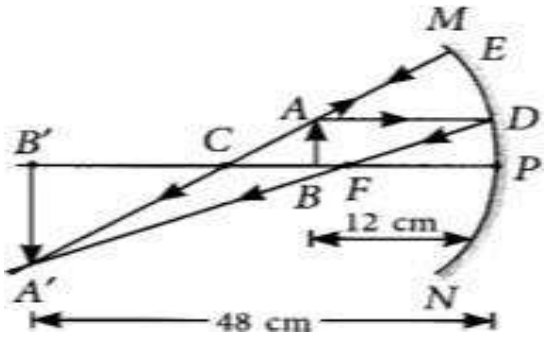
32	(a) A solenoid is a coil that has many circular turns of insulated copper wire, which are arranged closely in the shape of a cylinder.  (b) The deflection of the electron beam as seen by the observer is to his right side. Then by applying Fleming's left-hand rule we find that the magnetic field is acting in a vertically downward direction. **OR** Three methods of producing magnetic fields are as follows, (i)Using permanent magnets or horse-shoe magnets at the place where the magnetic field is required. (ii) By using electromagnets. (iii) Using current-carrying conductors or a current-carrying coil.	1 1 1 1 1 1
33	UV radiation split some molecular oxygen(O_2) into free (O) atoms. These oxygen atoms then combine with the molecular oxygen to form ozone. $O_2 \xrightarrow{UV} O + O$ $O + O_2 \longrightarrow O_3$ Ozone layer protects all life forms from the harmful effects of ultra-violet radiations. The amount of ozone dropped sharply in the 1980's because of the release of chemicals like chlorofluorocarbons (CFC's) used in fire extinguishers and refrigerators.	1 0.5 0.5 1
	SECTION -D	
34	(a) Ethanol having chemical formula C_2H_5OH is the active ingredient of all alcoholic drinks. Uses of ethanol: (i) Ethanol is widely used in industry as a solvent. (ii) Ethanol is used as an antiseptic for wounds in the form of rectified spirit. (b) (i) When a small piece of sodium is dropped into ethanol then hydrogen gas is liberated which burns with a pop sound. $2C_2H_5OH + 2Na \rightarrow 2C_2H_5O^-Na^+ + H_2 \uparrow$ Sodium ethoxide	1 1 1 1

	(ii)  **OR** (a) Isomers are those molecules which have the same molecular formula but different structural formula i.e., show different properties. (b) Two possible isomers of the compound, C_3H_6O are:  (c) (i) Molecular formula of ethane is C_2H_6. Its electron dot structure is :  (ii) Molecular formula of ethene is C_2H_4. Its electron dot structure is : 	1 1 2 1 1
35	(a) The male shows masculine features and attains fertility/ sperm starts forming in testes. Secondary sexual characters develop. (b) Pollen tube forms and male gametes are carried by it to the ovule. (c) Fertilization occurs and a zygote forms. (d) Three new Planaria will form due to regeneration. (e) New plantlets will form from these buds helping the plant to propagate vegetatively by leaves. **OR**	1x5

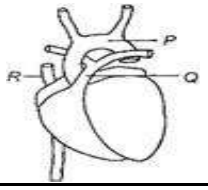
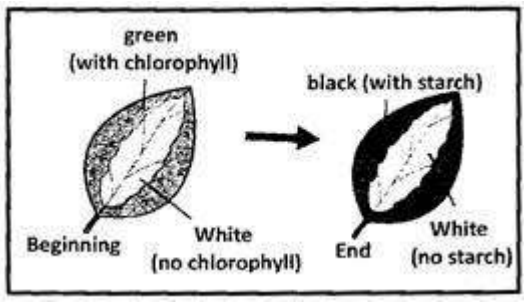
	 (a) (i) Ovaries help in production of female gametes or ovum and the secretion of female sex hormone. (ii) Fallopian tube is the site of fertilization of the ovum. (iii) Uterus is the site of implantation of the fertilized ovum. (b)Placenta provides a large surface area for glucose and oxygen to pass from the mother to the embryo. The waste substances generated by the developing embryo is also removed through the placenta. Placenta is a special disk like tissue which develops between uterine wall and the embryo after implantation.	3 2
36	(a) The property of a conductor due to which it opposes the flow of current through it, is called resistance. (b) The resistance of a conductor depends on length, thickness, nature of material and temperature of the conductor. Long wire (or conductor) has more resistance and a short wire has less resistance. A thick wire has less resistance whereas a thin wire has more resistance. (c) Length of the metal, l = 1 m Resistance, R = 104 Ω at temperature, t = 20° C Diameter of the wire, d = 0.15 mm radius, r = $0.15/2 \times 10^{-3}$ *Formula:* Resistivity, $S = \frac{R \times A}{l}$ $A = \pi r^2 = \frac{22}{7} \times \frac{0.15}{2} \times \frac{0.15}{2} \times 10^{-6}\ m^2$ $\therefore$ $A = 176.785 \times 10^{-10}\ m^2$ $S = \frac{104 \times 176.785 \times 10^{-10}}{1} = 183.86 \times 10^{-8}\ \Omega m$	1 2 1 1
	SECTION -E	

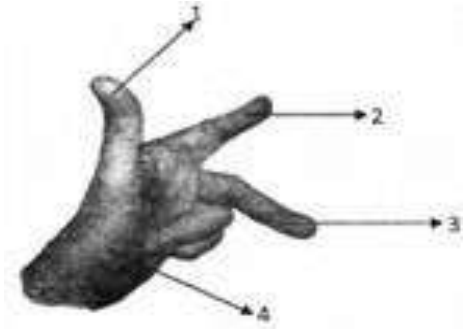
37	(a) The carbonates ores are changed into oxides by heating strongly in limmited air. This process is known as Calcination. (b) Mercury is the only metal that exists as a liquid at room temperature. It can be obtained by heating cinnabar (HgS), the sulphide ore of mercury. (c) Copper glance (Cu_2S) when heated in air gets partially oxidised to copper oxide which further reacts with the remaining copper glance to give copper metal.	1 1 2

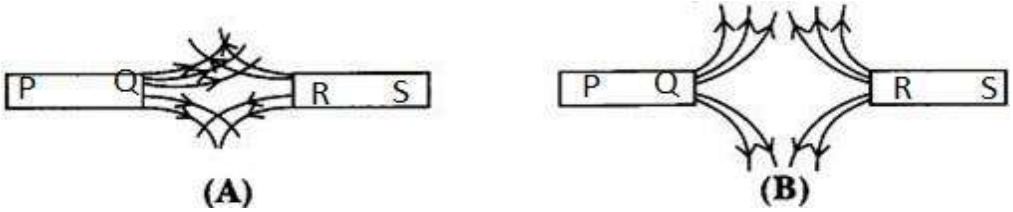
	$2Cu_2S_{(s)} + 3O_{2(g)} \xrightarrow{\Delta} 2Cu_2O_{(s)} + 2SO_{2(g)}$ Copper glance (from air) Copper oxide Sulphur dioxide $2Cu_2O_{(s)} + Cu_2S_{(s)} \xrightarrow{\Delta} 6Cu_{(s)} + SO_{2(g)}$ Copper metal **OR** The reaction of iron (III) oxide, Fe_2O_3 with aluminium is highly exothermic and the iron produced melts. This molten iron is used to join cracked iron parts of machines and railway tracks. $Fe_2O_{3(s)} + 2Al_{(s)} \xrightarrow{\text{Ignited}} 2Fe_{(l)} + Al_2O_{3(s)} + \text{Heat}$ Iron (III) oxide Aluminium Iron (melt) Aluminium oxide	2
38	(a) Green and 25% (b) 1:2 (c)  **OR** (c)The traits which are expressed in F_1 progeny are called dominant traits where as the traits which are unable to express themselves in F_1 progeny but reappear in the F_2 progeny are called recessive traits.	1 1 2 2
39	(a) Concave mirrors are used by dentist. Dentist uses it as it is a converging mirror and when used at close range forms a enlarged, virtual and erect image of the object. (b) It is a point on the principal axis where the rays of light parallel to principal axis meet. (c) A concave mirror can produce a magnified image of an object when object is placed: (i) In between its pole and its focus (ii) In between its focus and its centre of curvature. Difference between these two images:	1 1 2

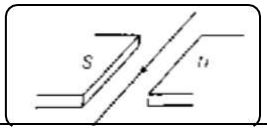
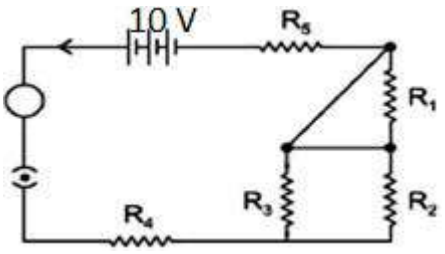
	The image produced in first case will be virtual and erect. The image produced in second case will be real and inverted **OR** (c)  	2

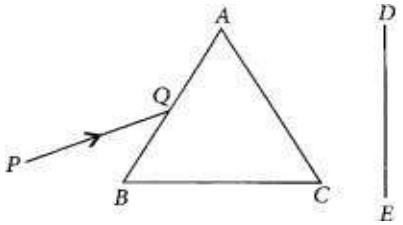
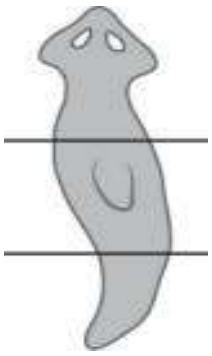
	SCIENCE (086) **CLASS-X** **Sample Question Paper - 7 (2022-23)** **Max. Marks: 80** **Time Allowed: 3 Hours** **General Instructions:** *i. This question paper consists of 39 questions in 5 sections.* *ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.* *iii. **Section A** consists of 20 objective type questions carrying 1 mark each.* *iv. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.* *v. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words* *vi. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.* *vii. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts*	
	SECTION - A Select and write one most appropriate option out of the four options given for each of the questions 1 – 20	
1	Choose the chemical formula of Washing soda. a) $Na_2CO_3.\ 2H_2O$ b) $Na_2CO_3.\ H_2O$ c) $Na_2CO_3.\ 10H_2O$ d) $Na_2CO_3.\ ½\ H_2O$	1
2	Identify the oxidizing and reducing agent for the following reaction respectively **$ZnO + C \rightarrow Zn + CO$** a) ZnO & C b) C & ZnO c) C & Zn d) CO& ZnO	1
3	Choose the correct balanced chemical equation for the reaction, when Iron reacts with steam. a) $2Fe(s) + 3H_2O(g) \rightarrow Fe_2O_3(s) + 3H_2(g)$ b) $3Fe\ (s) + 4H_2O\ (g) \rightarrow Fe_3O_4(s) + 4H_2(g)$ c) $Fe\ (s) + H_2O\ (g) \rightarrow Fe_3O_4(s) + H_2(g)$ d) $2Fe(s) + 3H_2O(g) \rightarrow Fe(OH)_3(s) + 3H_2(g)$	1
4	Which of the following functions is performed by the sensory neuron? a) It transfers impulses from the receptor to the effector. b) It transfers impulses from the effector to the motor neuron. c) It transfers impulses from the receptor to the central nervous system. d) It transfers impulses from the central nervous system to the receptor.	1
5	Name the gas released when Potassium carbonate reacts with Hydrochloric acid. a) Hydrogen b) Chlorine c) Carbon dioxide d) Hydrogen sulphide	1
6	Which of the following statements is correct about an aqueous solution of an acid and of a base? (i) Higher the pH, stronger the acid (ii) Higher the pH, weaker the acid	1

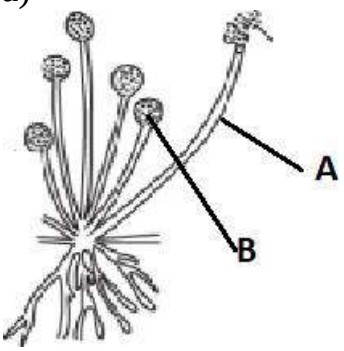
	(iii) Lower the pH, stronger the base (iv) Lower the pH, weaker the base (a) (i) and (iii) (b) (ii) and (iii) (c) (i) and (iv) (d) (ii) and (iv)	
7	Choose the correct IUPAC name for the following compound $CH_3CH(Cl)CH_2CH_2CH_2OH$ a) 2-chloropentanol b) 4-chloropentanol c) 2-chloropentan-5-ol d) 2-cholopentan-2-ol	1
8	Which of the following statements are correct regarding the given figure?  (i) The parts labelled as Q and R carry blood having low oxygen concentration. (ii) The parts labelled as P, Q and R carry blood having low oxygen concentration. (iii) The blood flows out of the heart through blood vessel Q when ventricle contracts. (iv) The blood is flowing out of the heart through blood vessel O when atria contract. a) (ii) and (iv) only b) (ii), (iii) and (iv) only c) (i), (ii) and (iii) only d) (i) and (iii) only	1
9	What is the aim of the given experiment?  a) To show that chlorophyll is necessary for photosynthesis b) To show that sunlight is necessary for photosynthesis c) To show that oxygen is released as a result of photosynthesis d) To show that leaves can be double colored	1
10	In a plant X, a pure tall plant (TT) is crossed with a short plant (tt). The ratio of pure tall plants to short plants in F2 is: a) 3 : 1 b) 1 : 3 c) 1 : 1 d) 2 : 1	1
11	What happens when a solution of an acid is mixed with a solution of a base in a test tube? (i) Temperature of the solution decreases (ii) Temperature of the solution increases (iii) Temperature of the solution remains the same (iv) Salt formation takes place (a) (i) and (iv) (b) (i) and (iii) (c) (ii) only (d) (ii) and (iv)	1

12	The given diagram shows the carpel of an insect pollinated flower. What is the most likely reason for the non-germination of pollen grain Z?  a) Pollen grains X and V were brought to the stigma earlier, therefore, their germination inhibited the germination of pollen grain Z. b) Pollen grain Z was brought to the flower by wind, while pollen grains X and Y were brought to the flower by insects. c) Pollen grain Z lacks protrusions that allow it to adhere properly onto the stigma surface. d) Pollen grain Z comes from a flower of any other species.	1
13	Which one of the following represents the direction of magnetic field in the figure of Fleming Left Hand Rule as shown below?  a) 1 b) 2 c) 3 d) 4	1
14	What should be the angle between the two mirrors so that, whatever may be the angle of incidence, the incident ray and the reflected ray from the two mirrors will he parallel to each other? a) 45^0 b) 75^0 c) 90^0 d) 120^0	1
15	Which of the following defects are corrected by using a convex lens? a) Myopia, Hypermetropia b) Hypermetropia, presbyopia c) Myopia, presbyopia d) Myopia, Cataract	1
16	A virtual image twice as big as the object is formed by a convex lens when the object is 10 cm away from it .A real image twice as big as the object will be formed when it is placed at a distance from the lens a) 40 cm b) 60 cm c) 20cm d) 70 cm	1
	Q. no 17 to 20 are Assertion - Reasoning based questions. **These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:** **a) Both A and R are true and R is the correct explanation of A.** **b) Both A and R are true and R is not the correct explanation of A.** **c) A is true but R is false.** **d) A is False but R is true.**	

17	**Assertion:** A yellow coloured precipitation is formed when aqueous solutions of lead nitrate and potassium iodide are mixed together. **Reason**: Lead iodide is formed due to double displacement reaction.	1
18	**Assertion: T**raits like tallness and dwarfness in pea plant are inherited independently. **Reason:** When a homozygous tall pea plant is crossed with dwarf pea plant, medium sized pea plant is obtained in F, generation.	1
19	**Assertion: Final digestion of** Carbohydrate mainly takes place in small intestine. **Reason :** Pancreatic juice contains the enzyme lactase.	1
20	**Assertion:** A normal human eye can clearly see all the objects below and above 25 m. **Reason:** The human eye has the capacity to suitably adjust the focal length of its lens to a certain extent.	1
	SECTION – B **Q. no. 21 to 26 are very short answer questions**	
21	a) A solution reacts with magnesium to give a gas which burns with **'pop'** sound. State the nature of the solution. b) A white shirt has a yellow stain of curry. When soap is rubbed on this shirt during washing, the yellow stain changes to reddish-brown. State the reason for the above observation. **OR** Take 3 g of barium hydroxide in a test tube, now add about 2 g of ammonium chloride and mix the contents with the help of a glass rod. Now touch the test tube from outside. (i) What do you feel on touching the test tube? (ii) State the inference about the type of reaction occurred. (iii) Write the balanced chemical equation of the reaction involved.	2
22	Smita's father has been advised by a doctor to reduce his sugar intake. a) Name the disease he is suffering from and name the hormone whose deficiency causes it. b) Explain how the time and amount of secretion of this hormone is regulated in human system.	2
23	a) A patient whose pancreas is not able to produce trypsin properly .How does it affect to the digestion process? b) Bile does not have enzymes but still it helps indigestion. Justify.	2
24	What are the end products formed during fermentation in yeast? Under what condition a similar process takes place in our body that leads to muscle cramps?	2
25	Magnetic field lines of two magnets are shown in fig. A and fig. B.  (A) (B) Select the figure that represents the correct pattern of field lines. Give reasons for	2

	your answer. Also name the poles of the magnets facing each other. **OR** a) Write two factors on which the strength of an electro-magnet depends. b) See the following diagram and identify the direction in which the current carrying wire tends to move. 	
26	In the following food chain, 100 J of energy is available to the lion. How much energy was available to the producers? Plants → Deer → Lion	2
	SECTION - C **Q.no. 27 to 33 are short answer questions.**	
27	A Metal nitrate **'P'** on heating strongly gives a yellow residue along with the evolution of nitrogen dioxide and oxygen gas. Aqueous solution of **'P'** on reaction with Potassium iodide solution forms a yellow precipitate of compound **'Q'**. a) Identify P, Q. b) Write the balanced chemical equations involved in the above processes. State the type of reaction.	3
28	A compound 'A' used for making statues on mixing with water gets converted into a hard substance 'B'. a) Write the common name and chemical formula of A, B, b) Write the balanced chemical equations for the reactions involved in the above process. c) List any other two uses of substance A.	3
29	a) Transpiration help in upward transport of water and minerals. Justify. b) Differentiate between transport in xylem and transport in phloem. **OR** Define tissue fluid. Mention its composition and function.	3
30	Consider the following electric circuit:  a) Which two resistors are connected in series? b) Which two resistors are connected in parallel? c) If every resistor of the circuit is of 2 Ω, what current will flow in the circuit	3
31	a) Define resistivity. b) Two wires 'A' and 'B' are of same length and same resistance. Resistivity of 'A' is greater than that of 'B'. Which one is thicker? Justify your answer.	3
32	A narrow ray of white light PQ is passing through a glass prism ABC as shown in the diagram. Trace it on your answer sheet and show the path of the emergent beam as observed on the screen DE.	3

	 I. Write the name and of the phenomenon observed. II. Where else in nature is this phenomenon observed? III. Based on this observation, state the conclusion which can be drawn about the constituents of white light. **OR** How will you use two identical glass prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light? Draw and label the ray diagram.	
33	a) State with reason any two possible consequences of elimination of decomposers from the earth. b) Why do producers always occupy the first trophic level in every food chain?	3
	SECTION - D **Q.no. 34 to 36 are Long answer questions.**	
34	A compound A ($C_2H_4O_2$) reacts with Na metal to form a compound 'B' and a combustible gas. Compound 'A' on treatment with an alcohol 'C' in presence of an acid forms a Sweet-smelling compound 'D' ($C_4H_8O_2$). On addition of NaOH to 'D' gives back B and C. **a)** Identify **A, B, C, D.** b) Write the balanced chemical equation for all the reactions taking place in the above. **OR** a) Define catenation. b) Draw the electron dot structure of ethane. c) Two organic compound **A** and **B** have same molecular formula (**C_6H_{12}**). Draw the structure, if i. A is a cyclic compound ii. B is straight chain unsaturated compound. iii. State the relation between A & B.	5
35	a) A student takes a planaria in the lab and cuts into three parts as shown. What will likely happen?  b) State the advantages of vegetative propagation. Name two plants which can be propagated by vegetative propagation. **OR**	5

	a)  Identify the organism and state the mode of reproduction it is undergoing. b) Identify A and B. c) State three advantages of sexual reproduction over asexual reproduction.	
36	a) Write relation between u, v, f for lenses and for mirrors, where u v, f are object distance, image distance and focal length respectively. b) The magnification produced by a convex lens is m= + 4. Write the information about the image given by this statement. c) A 5 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 30 cm. Find the I. position II. nature III. size of the image formed.	5
	SECTION - E Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub -parts. Internal choice is provided in one of these sub-parts.	
37	All metals do not react with oxygen with the same speed. Different metals show different reactivity towards oxygen. For example, potassium and sodium react so vigorously that they catch fire even if kept in the open air. They are, therefore, kept under kerosene or paraffin oil. Metal oxides are solids. They are basic in nature. Metal oxides being basic turn red litmus to blue. Some metal oxides such as aluminium oxide, zinc oxide, etc., show both acidic as well as basic behaviour. a) Name two metals that react violently with cold water. b) An element X forms an oxide X_2O, which is basic in nature. What type of element is 'X'? c) What happens to the red litmus when it is treated with the solution of ash obtained after burning magnesium ribbon in air? **OR** Zinc oxide is amphoteric oxide. Justify the statement with chemical equations.	4
38	In human, the allele for brown eyes (B) is dominant over that for blue eyes (b). A brown eyed woman marries a blue eyed man, and they have six children. Four of the children are brown eyed and two of them are blue eyed. a) What is the genotype of blue eyes offspring? b) What is the woman's genotype? c) Mention the above process of inheritance in a flow chart. **OR**	4

	Genes control characteristics, or traits. Justify.	
39	To demonstrate the pattern of magnetic field lines around a straight conductor carrying current Soma did the following experiment i) She attached the thick wire through a hole at the middle of the cardboard and clamps it in a stand. ii) Attached the ends of the wire through a key, variable resistor and an ammeter on either side of a battery and hold it vertically and perpendicularly to the board. iii) Spreaded the iron filings uniformly on the cardboard and place the magnetic needle on the board. iv) Closed the key and tap the cardboard slightly and observe the orientation of iron filings. **Now answer the following questions** a) Write the nature of magnetic field lines that she observed. b) State the rule to find the direction of magnetic field associated with a current carrying straight conductor. c) Draw the magnetic field lines pattern around a current carrying straight when it is bent to form a loop. What is the nature of magnetic field lines at the centre of the circular loop? **OR** c) The magnetic field strength of a single loop of a current carrying coil is 'x'. If the coil contains 'n' turns, what is the magnetic field strength of this current carrying coil? Justify.	4

	SCIENCE (086) **CLASS-X** **Sample Paper – 7 (2022-23)** **Marking Scheme**	
Q NO.	KEY WORDS / VALUE POINTS	MARK
1	c) $Na_2CO_3.10H_2O$	1
2	a) ZnO & C	1
3	c) $3Fe(s) + 4\ H_2O \rightarrow Fe_3O_4 + 4H_2(g)$	1
4	C) It transfers impulses from the receptor to the central nervous system.	1
5	c) Carbon dioxide	1
6	(d) (ii) and (iv)	1
7	b) 4-chloropentanol	1
8	D) (i) and (iii) only	1
9	A) To show that chlorophyll is necessary for photosynthesis	1
10	C) 1 : 1	1
11	d) (ii) and (iv)	1
12	D) Pollen grain Z comes from a flower of any other species.	1
13	b) 2	1
14	c) 90^0	1
15	a) Hypermetropia, presbyopia	1
16	B) 60 cm	1
17	a) Both (A) and (R) are true and (R) is the correct explanation of (A).	1
18	C. A is true but R is false	1
19	C. A is true but R is false	1
20	**d)** (A) is False but (R) is true.	1
	SECTION – B	
21	a) Acidic solution b) As turmeric changes its colour to reddish brown in basic medium, i.e soap is basic in nature.	1 1

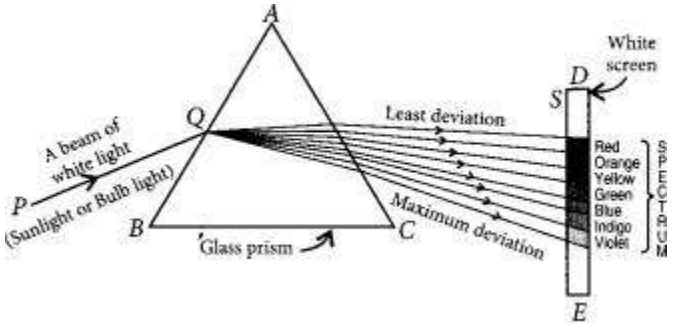
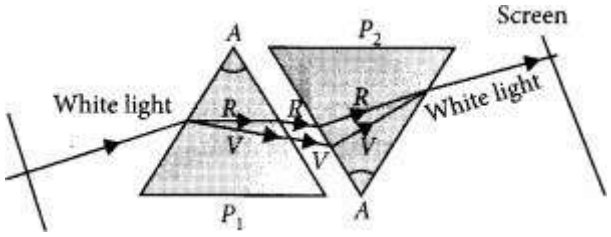
	OR When barium hydroxide is added into ammonium chloride, the bottom of test tube is found to be cooler. (ii) It is an endothermic reaction. (iii) $Ba(OH)_2 + 2NH_4Cl \rightarrow BaCl_2 + 2NH_4OH$	1 1
22	a) The disease that he is suffering from is diabetes and the hormone whose deficiency causes it is insulin. b) The time and amount of secretion of this hormone is regulated in human system is as follows. If the sugar levels in blood rise, they are detected by the cells of the pancreas which respond by producing more insulin. As the blood sugar level falls, insulin secretion is reduced.(feedback mechanism)	1+1=2
23	a) A patient whose pancreas is not able to produce trypsin properly .It will affect to the protein digestion. b) Bile helps in emulsification of fats that helps in further digestion of fat.	1 1
24	The end products formed during fermentation in yeast are ethanol, CO_2 and H_2O. Accumulation of Lactic Acid.	1+1=2
25	Figure 'B' represents the correct pattern of field lines as no two field lines intersect here. P & S- South pole Q & R- North pole **OR** a) No of turns and amount of current. b) Down word.	1 ½ ½ ½ + ½ 1
26	As per 10% law of flow of energy in an ecosystem only 10% of energy is received by the next trophic level. Hence, in the given food chain . If 100 J of energy is available to lion, the plants or producers have 10,000 J of energy available to them. Plants → Deer → Lion 10, 000 J 1000 J 100 J	1+1=2
	SECTION - C	
27	a) P- $Pb(NO_3)_2$ Q- PbI_2 b) $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2$ $Pb(NO_3)_2 + 2KI \rightarrow PbI_2 + 2KNO_3$	½ + ½ 1 1

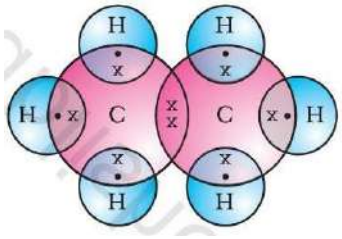
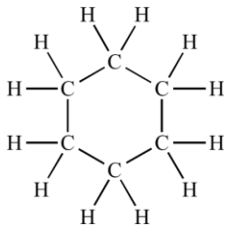
<table>
<tr><td>28</td><td>a) A : Plaster of Paris, $CaSO_4 . ½ H_2O$
B: Gypsum , $CaSO_4 . 2 H_2O$
b) $CaSO_4 . ½ H_2O + 1½ H_2O$ ----- → $CaSO_4 . 2 H_2O$
c) Setting fractured bone
Making surface smooth (any other relevant)</td><td>½
½
1

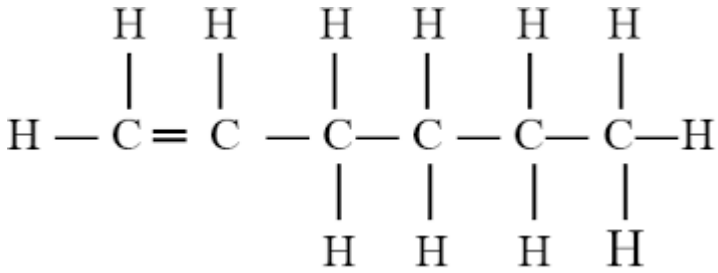
½ + ½</td></tr>
<tr><td>29</td><td>a) Transpiration help in upward transport of water and minerals .It creates a suction pull which helps in upward movement of water.
b)
<table>
<tr><th>Transport of material in Xylem</th><th>Transport of material in phloem</th></tr>
<tr><td>1. The xylem supplies water from the roots to the stem and leaves.</td><td>1. Phloem transports food resources from leaves to other plant portions.</td></tr>
<tr><td>2. Water is transported from ascending roots to aerial parts of the plants.</td><td>2. The movement of food in phloem is bidirectional.</td></tr>
<tr><td>3. Physical forces such as transpiration pull are required for transport in the xylem.</td><td>3. The transport of food through the phloem requires ATP (Adenosine triphosphate) energy.</td></tr>
</table>
OR
Lymph is tissue fluid. Through the pores present in the walls of capillaries some amount of plasma, proteins and blood cells escape into intercellular spaces in the tissues to form the tissue fluid or lymph.
It is similar to the plasma of blood but colorless and contains less protein.
Lymph carries digested and absorbed fat from intestine and drains excess fluid from extra cellular space back into the blood.</td><td>1+2=3

1+1+1=3</td></tr>
<tr><td>30</td><td>(a) R_4 and R_5 are connected in series.
(b) R_2 and R_3 are connected in parallel.
(c) $R_p = \frac{R_2 \times R_3}{R_2 + R_3} = 1\Omega$
$R_{eq} = R_4 + R_5 + R_p = 5\Omega$
I=10/5 A= 2A</td><td>1
1

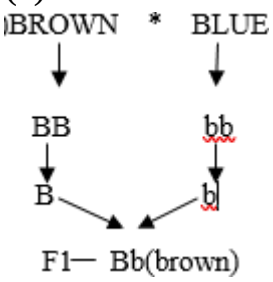
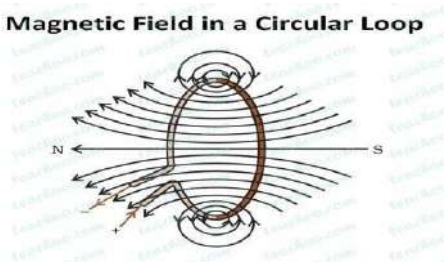
1</td></tr>
<tr><td>31</td><td>a) Resistivity is the resistance of a conductor of unit length and unit area of cross-section.
b) $A = \frac{P \times l}{R}$</td><td>1</td></tr>
</table>

	As length and resistance are constant , area of cross-section is directly proportional to resistivity. As Resistivity of 'A' is greater than that of 'B', area of cross-section of ' A' is more and hence resistance wire 'A' is thicker.	**2**
32		1
	I. The phenomenon of the splitting up of the white light into its constituents colours is called dispersion of light	½
	II. The formation of rainbow is caused by the dispersion of the white sunlight into its constituent colours.	½
	III. Based on the dispersion of white light into its constituents colours, we can conclude that (a) The white light consists of seven colours. (b) The violet light suffers maximum deviations and the red light suffers minimum deviation	½ ½
	OR	
	When two identical inverted prisms are kept closed to each other the white light disperses in first prism into seven colours and allowed all the colours of the white light to pass through the second prism combining to form a white light emerging from the other side of the second prism.	1 ½
		1 ½

33	a) Consequences of elimination of decomposers are: (i) There would be no recycling of nutrients and therefore, raw materials to produce food will not be available to producers. Hence, the food chains will get affected. (ii) The dead bodies of plants and animals will go on accumulating in the absence of decomposition thereby polluting the environment. b) Producers are the green plants that can manufacture food using CO_2 and H_2O in the presence of sunlight, i.e., they are autotrophs. They serve as a source of food for all non-producers or consumers directly or indirectly. Hence, producers occupy the first trophic level in a food chain.	3
	SECTION - D	
34	a) A- CH_3COOH B - CH_3COONa C- C_2H_5OH D- $CH_3COOC_2H_5$ b) $2CH_3COOH + 2Na \rightarrow 2CH_3COONa + H_2$ $CH_3COOH + C_2H_5OH \xrightarrow{Conc\ H2SO4} CH_3COOC_2H_5$ $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$ **OR** a) Carbon has the unique ability to form bonds with other atoms of carbon, giving rise to large molecules. This property is called catenation. b)  c) i) Compund -A 	½ x 4 1 1 1 1 1 1

	ii) Compound B –  iii) Isomer	1 1
35	a) It will regenerate into three individuals of Planaria by the process of regeneration. b) Advantages of vegetative propagation: i) It helps in the preservation of the characters of the plants through successive generations as the genetic character is same for the parent plant and offspring. ii) Seedless plants can be grown through vegetative reproduction through cutting and grafting methods and hence there is a higher probability of plant development. iii) It is a cheaper, easier and more rapid method of plant. Two plants which can be propagated by vegetative propagation – sugarcane and rose. **OR** a) Rhizopus and the mode of reproduction –Spore formation b) A- sporangiophore and B-sporangium c) In sexual reproduction both parents are involved hence offspring get attributes of both parents. Organisms produced by sexual reproduction have a greater survival rate as compared to asexual reproduction. Organisms have variation which is adapted to various environments.	1+3+1=5 1+1+3=5

36	a) u v, and f reflection is given by lens formula $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ Mirror formula $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$	½ ½
	b) m =+ 4 of a convex lens means is image is 4 times enlarged and virtual	½ + ½
	c) i. Given, h = 5 cm u =- 30 cm f =+ 20 cm v = ? $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\frac{1}{v} - \frac{1}{-30} = \frac{1}{f}$ $\frac{1}{v} = \frac{1}{-30} + \frac{1}{20} = \frac{1}{60}$ V= 60 cm	½ ½ ½
	ii. Nature of the image is real, inverted and magnified. iii. m =(h_i /h_o)= v/u h_o = - 10 cm	½ ½
	SECTION - E	
37	a) Metals like potassium and sodium react violently with cold water.	1
	b) Since element X forms an oxide which is basic in nature and therefore 'X' is a metal.	1
	c) When magnesium is heated, it burns with a dazzling white flame to form magnesium oxide. This metal oxide is basic in nature and thus turns red litmus to blue. **OR** As Zinc oxide can react both with acid as well as base, it is amphoteric in nature $ZnO + 2HCl \rightarrow ZnCl_2 + H_2O$ $ZnO + 2NaOH \rightarrow Na_2 ZnO_2 + H_2O$	1+1 1+1
38	In human, the allele for brown eyes (B) is dominant over that for blue eyes (b). A brown eyed woman marries a blue eyed man, and they have six children. Four of the children are brown eyed and two of them are blue eyed.	4

	(a) genotype of blue eyed offspring -bb (b) What is the woman's genotype-BB (c)  **OR** (d) A section of DNA that provides information for one protein is called the gene for that protein. If this enzyme works efficiently, a lot of hormone will be made, and the plant will be tall. If the gene for that enzyme has an alteration that makes the enzyme less efficient, the amount of hormone will be less, and the plant will be short. Thus, genes control characteristics, or traits.	
39	a) Magnetic field lines around a straight conductor carrying current are concentric circles. b) Imagine that you are holding a current-carrying straight conductor in your right hand such that the thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field c)  At the centre it is straight **OR** d) if there is a circular coil having n turns, the field produced is n times as large as that produced by a single turn. This is because the current in each circular turn has the same direction, and the field due to each turn then just adds up. So resultant field strength is nX.	1 1 1 ½ ½ 2

SCIENCE (086)
CLASS-X
SAMPLE QUESTION PAPER - 8 (2022-23)

Maximum Marks: 80 **Time Allowed:3 Hours**

General Instructions:

i). This question paper consists of 39 questions in 5 sections.

ii). All questions are compulsory. However, an internal choice is provided in some questions.
A student is expected to attempt only one of these questions.

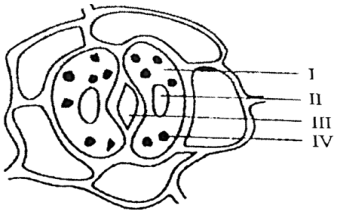
*iii). **Section A** consists of 20 objective type questions carrying 1 mark each.*

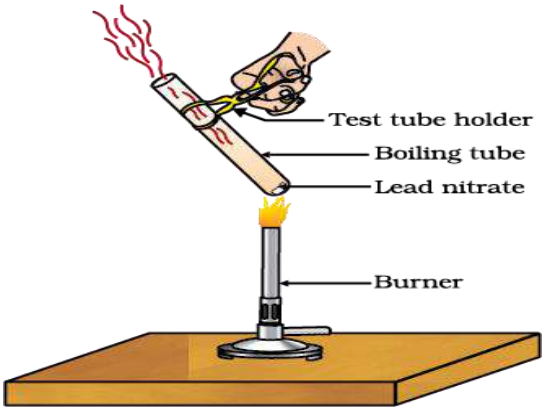
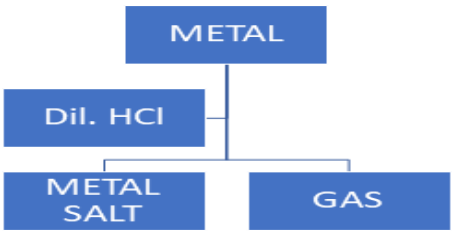
*iv). **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.*

*v). **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80words*

*vi). **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*

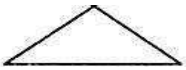
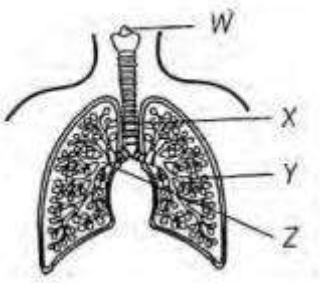
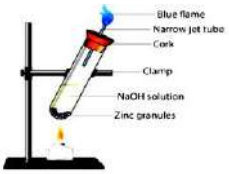
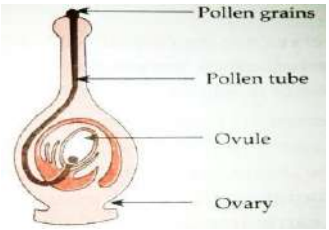
*vii). **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

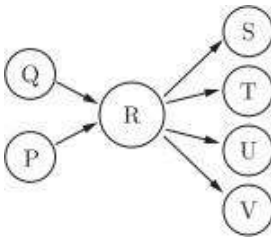
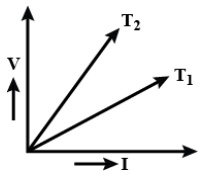
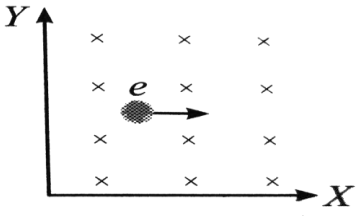
1	**SECTION: A**  Which among the above shrink and swell due to water? (a)I (b)II (c)III (d)IV	1
2	In the redox reaction $H_2S + I_2 \rightarrow 2HI + S$ (a)H_2S is reduced to S &$I_2$is oxidized to HI (b)H_2S is oxidized to S &I_2 is reduced to HI (c) I_2 is oxidized to HI and H_2S is reduced to S (d)I_2 is oxidized to S and H_2S is reduced to HI	1

3	The correct observation of the following reaction is  (a) Yellow residue and a colourless gas is formed which burns with pop sound. (b) Yellow residue and a colourless gas is formed which turns lime water milky. (c) Brown residue and a colourless gas is formed which burns with pop sound. (d) Yellow residue and a reddish brown gas is formed.	1
4	Which of the following combinations are correct?  (a)(i) and (iii) (b)(ii) and (iii) (c)(ii) and (iv) (d)(iii) and (iv)	1

	Metal	Gas Evolved
(i)	Silver	Yes
(ii)	Magnesium	Yes
(iii)	Aluminium	Yes
(iv)	Zinc	No

5	Solutions of zinc sulphate, silver nitrate , iron (II)sulphate, magnesium sulphate are placed in beakers A,B, C and D respectively. Copper pieces are added to each beaker. Blue colour will appear in case of (a) Beaker A (b) Beaker B (c)Beaker C (d) Beaker D	1
6	The aqueous solution of one of the following salts will turn phenolphthalein indicator pink. The salt is (a)K_2SO_4 (b) KCl (c)K_2CO_3 (d) KNO_3	1

7	$CH_3 - CH = CH_2$ and  Propene Cyclopropane The relation between the above two compounds is (a) Isobars (b) Isomers (c) Homologue (d) Isotope	1
8	The diagram shows human gas exchange system. |	Bronchus	Bronchiole	Larynx	Trachea
---	---	---	---	---
(a)	W	X	Z	Y
(b)	X	Z	Y	W
(c)	Y	W	X	Z
(d)	Z	Y	W	X |  What are W, X Y and Z?	1
9	Observe the following experimental set up .  The products formed in the above reaction are (a) Na_2ZnO_2 , CO_2 (b) NaOH , H_2 (c)Na_2ZnO_2 , H_2 (d) NaOH , CO_2	1
10	If two parents have genotypes AA x aa. The probability of having an aa in F2 generation is (a)25 percent (b)50 percent (c)75 percent (d)100 percent	1
11	Study the diagram below and identify the trophic movement . (a)Phototropism (b)Geotropism (c)Chemotropism (d)Hydrotropism 	1

12	The diagram represents gametes P, Q fusing to give the cell R. This cell then produces gametes S, T,U and V. Which of the following is correct ? (a)The number of chromosomes in P and Q are different. (b)The number of chromosomes in Q and R are same. (c)The number of chromosomes in S is one quarter of chromosome R (d)The number of chromosomes in S and T are same. 	1
13	A student plots a V-I graph for two conductors which are at different temperatures. Which one of the following statements is correct regarding the temperature of the wire. (a)The value of $T_1$is greater than the value of T_2 (b)The value of $T_1$is less than the value of T_2 (c)The value of $T_1$is equal to the value of T_2 (d)The value of T_1 is twice the value of T_2 	1
14	A current is I ampere is flowing through the solenoid .With reference to the figure the strength of the magnetic field is maximum at (a)C (b) B (c)A (d) All of these	1
15	A current of 4.8 A is flowing in a conductor. The number of electrons passing per second through the conductor will be (a) 3×10^{19} (b) 76.8×10^{-19} (c) 1.6×10^{19} (d) 0.625×10^{-17}	1
16	An electron moves into the magnetic field from west as given in the figure .The electron will deflect (a) Upwards (b) Downwards (c) Towards north (d) Towards south 	1

Question number 17 to 20 Assertion- Reasoning based questions. These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

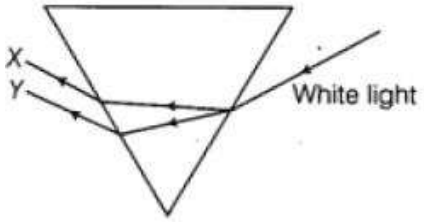
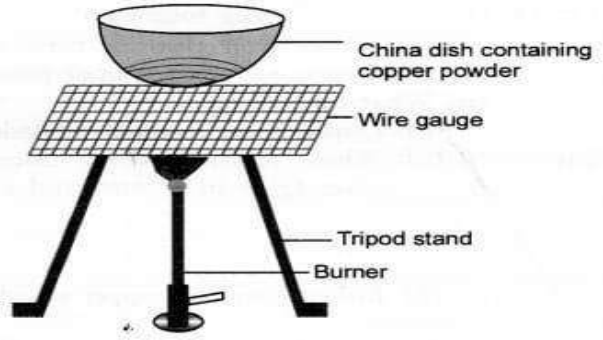
(a) Both A and R are true and R is the correct explanation of the A.

(b) Both A and R are true and R is not the correct explanation of the A.

(c) A is true but R is false.

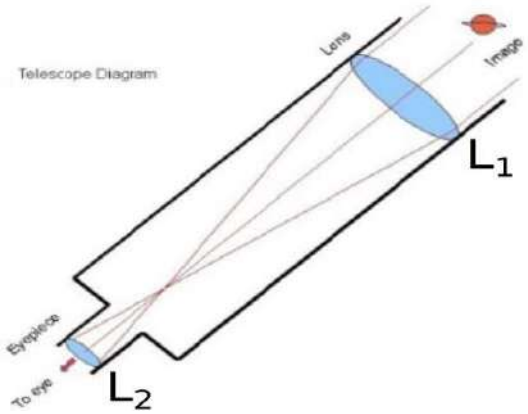
(d) A is false but R is true.

17	**Assertion(A):** $Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe +$ heat The above chemical reaction is an example of double displacement reaction. **Reason(R):** Aluminium being more reactive than iron displaces iron from Fe_2O_3.	1
18	**Assertion (A):** Sexually reproducing organisms have better chances ofsurvival than asexually reproducing organisms. **Reason(R):** Variation is more in sexually reproducing organisms.	1
19	**Assertion (A):** Translocation of sugar occurs through phloem. **Reason(R):** It is achieved by diffusion in companion cells and sieve tubes	1
20	**Assertion (A):** Magnetic field lines are closed and continuous curves. **Reason (R):** Outside the magnet the field lines emerge from north pole and merge at south pole but inside the magnet its direction is from north pole to south pole.	1
	SECTION: B **Q. no. 21 to 26 are very short answer questions.**	
21	An element **A** has atomic number 12 and another element **B** has atomic number 17. Show the formation of the compound between **A** and **B** with correct electron dot structures. **OR** Ramu added dilute Hydrochloric acid to four metals and recorded his observations as shown in the table given below: **Metal** / **Gas Evolved** Aluminium — Yes Silver — Yes Magnesium — No Calcium — Yes Select the correct observation(s) and write chemical equation(s) of the reaction involved.	2
22	How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?	2
23	Bile juice does not contain any enzyme, still it is essential for digestion. Give reason.	2
24	Plants have low energy needs and can use relatively slow transport systems. Justify.	2
25	The sun is visible to us about 2 minutes before the actual sunrise. Explain with the help of a suitable diagram and name the phenomenon responsible for this.	2

	OR  A white light is incident on a prism as given in above figure. (a) Identify the colour for which the value refractive index of the prism is maximum. Justify your answer with suitable calculation. (b) If the white light will be replaced by a red colour light, then mention the colour of light that will come out of the glass prism .	
26	Our food grains contain varying amount of pesticides. Give reason.	2
	SECTION: C **Q. no. 27 to 33 are short answer questions**	
27	 Study the above diagram and answer the following questions: (a)Write the chemical reaction involved in the process. (b)Mention the type of the reaction taken place during heating. (c)State the change occurs when H_2 gas is passed through the product with the help of chemical equation.	2
28	When a gas **X** is passed through saturated solution of ammoniacal brine , two compounds **Y** and **Z** are formed.**Y** is used as antacid and decomposes to another solid **G** on heating . When **G** is added to dil HCl, **X** is formed again. (a) Identify **X, Y**, **Z** and **G**. (b)Write the balanced chemical equation for any one of the above reactions taking place.	3

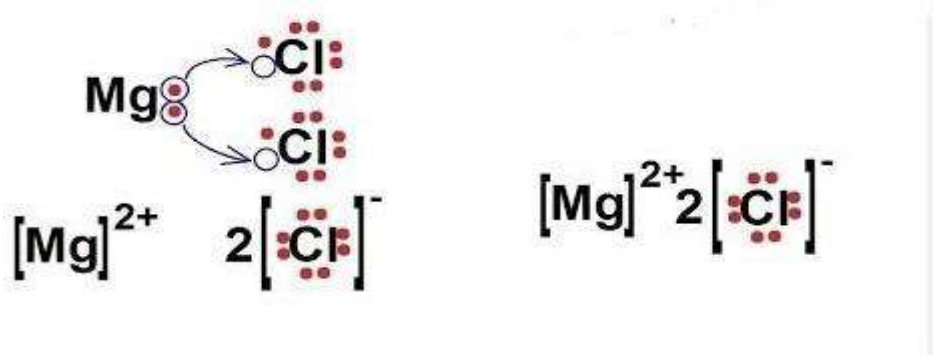
29	(a) The blood does not flow backward when atria and ventricles contract. Give reason. (b) Draw the flow chart to show the pathway of flow of blood in human being. **OR** How is lymph formed? State two functions of lymph.	3
30	The image formed by a mirror is real , inverted and is of magnification -1 . If the image is at a distance of 40cm from the mirror then (a) find the focal length of the mirror . (b) if the object is moved 25 cm towards the mirror , then find out the nature of the image formed . (c) Draw ray diagram for the new position of the object in the above case to justify your answer.	3
31	A person is unable to see the object placed beyond 2 m from his eyes (a) Name the defect of vision the person is suffering from . (b) Mention the type of lens that he should used for the correction of the defect and calculate its power . (c) Draw a labelled diagram for the correction of the defect in the above case.	3
32	A current carrying rod is placed inside a uniform magnetic field . List the observations about the displacement of the rod when : (a) current through the rod is increased (b) length of the rod is increased (c) strength of magnetic field is increased . Give reasons to support your answers in each case . OR A galvanometer is placed near a straight current carrying conductor What will happen to the deflection of the needle if: (a) The distance between the compass and a current – carrying straight conductor is halved. (b) if the current through the conductor is doubled (c) if the direction of the current is reversed in the conductor . Support your answers with suitable reason in each case .	3
33	a) How is Ozone formed? b) Name one chemical that depletes the ozone layer.	3
	SECTION: D **No 34 to 36 are long answer questions.**	
34	An organic compound **A** is an essential compound of wine and beer .On oxidation **A,** yields an organic acid **B** which is present in vinegar. When **A** is heated with excess of conc.H_2SO_4 at 443 K, it forms another compound **C**. When **C** is heated with H_2 in presence of Ni catalyst it forms another compound **D** .Identify **A**, **B**, **C**, **D.** Write all the chemical reactions involved. **OR** A compound **C** having molecular formula ($C_2H_4O_2$) reacts with Na metal to form a compound **R** and evolve a gas which burns with	5

	pop sound. Compound **C** on treatment with an alcohol **A** in presence of an acid forms a sweet smelling compound **S** (molecular formula $C_3H_6O_2$) .On addition of NaOH to **C**, it also gives **R** and water. **S** on treatment with NaOH solution gives back **R** and **A**. Identify **C,R,A,S** and write the reactions involved.	
35	(a) Name the vegetative and reproductive part of Rhizopus. (b) State the method of reproduction adopted by it. (c) Write the advantages of that mode of reproduction over other mode of reproductions. OR (a) Interpret from the following; ---Multicellular organisms reproduce by complex mode of reproduction. ----Sugarcane, roses, and grapes adopt vegetative propagation for reproduction. ---Variations are useful for a population. (b) Distinguish between male and female gamete.	5
36	Two wires of copper have the same length but cross-sectional area in the ratio of 3:1.The resistance of the thicker wire is 12 Ω. (a) Calculate the resistance of the thinner wire . (b) Find the equivalent resistance of both these wires , when they are connected (i) in series (ii) in parallel (c) If both the wires are connected in parallel to a battery of 24 volt, then find out the ratio of heat produced in the thicker wire to the thinner wire identify the wire if both of them are connected to the same source for the same time duration.	5
SECTION: E **Q.no. 37 to 39 are case-based /data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.**		
37	Ores are the minerals from which metals can be extracted profitably. Metallurgy is defined as a process that is used for the extraction of metals in their pure form. **X** is an ore of a metal **Y** which is abundant in earth crust and hydroxide of **Y** is used in white washing. **X** on treatment with dilute hydrochloric acid produce brisk effervescence. (a) Identify **X** and **Y**. (b) Write the reaction of **X** with dilute HCl. (c) Explain how can you convert **X** to the oxide of **Y**. Mention the chemical equation also. **OR** (c) Explain the process of extraction of **Y** from its molten ore.	4

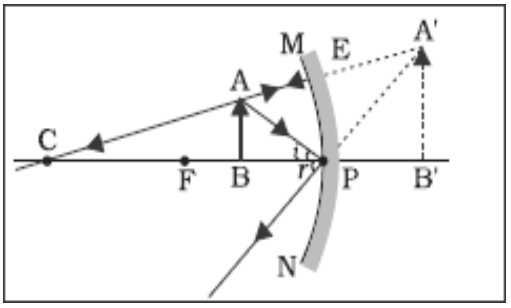
38	A farmer cross pollinated to pea plants having round and wrinkled seeds, respectively. DOMINANT TRAIT RECESSIVE TRAIT NO. OF OFFSPRING ROUND SEED WRINKLED SEEDS 7524 (a) From these results, find out the actual number of round seeds he obtained in F2 generation. (b) State the genotype of F1 generation. (c) Find the ratio of pure round and pure wrinkled in F2 generation with the help of a cross. **OR** (c) Find the percentage of round and wrinkled seeds in F2 generation with the help of a cross.	4
39	Sruti wanted to see the stars of the night sky. She knows that she needs a telescope to see those distant stars. She finds out that the telescopes, which are made of lenses, are called refracting telescopes and the ones which are made of mirrors are called reflecting telescopes. So she decided to make a refracting telescope. She bought two lenses, L_1 and L_2 , out of which L_1 was bigger and L_2 was smaller. The larger lens gathers and bends the light, while the smaller lens magnifies the image. Big, thick lenses are more powerful. So to see far away, she needed a big powerful lens.   (a) Based on the diagram shown, what kind of lenses would Sruti need to make the telescope? (b) If the powers of the lenses L_1 and L_2 are in the ratio of 1:4,then which lens will produce more convergent light ? (c) The telescope has a convex lens (Eyepiece) with a focal length of 20 cm. The object is placed at a distance of 15cm from the lens. How far away from the convex lens (Eyepiece) an image will be formed? **OR** (c) When the object is placed very far from the lens L_1 (Objective) an inverted image is formed at a distance of 0.3 m from the lens. So draw a ray diagram to show the formation of image in this situation. to scale)	4

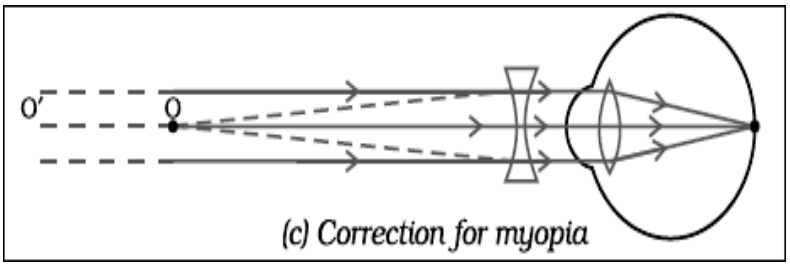
SCIENCE (086)
CLASS-X
Sample Paper – 8 (2022-23)
Marking Scheme

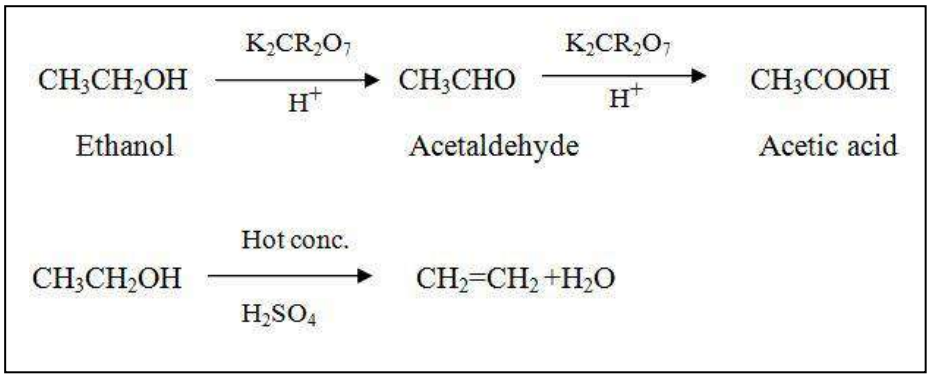
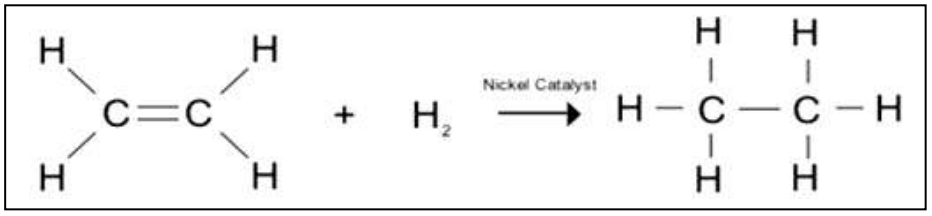
Sl.No.	**Key Words**	**Value Points**
1.	(a)	1
2.	(b)	1
3.	(d)	1
4.	(b)	1
5.	(b)	1
6.	(c)	1
7.	(b)	1
8.	(d)	1
9.	(c)	1
10.	(a)	1
11.	(c)	1
12.	(d)	1
13.	(b)	1
14.	(c)	1
15.	(a)	1
16.	(d)	1

17.	(d) A is false but R is true	1
18.	(a) Both A and R are true and R is the correct explanation of A	1
19.	(b) Both A and R are true and R is not the correct explanation of A	1
20.	(a) A is true but R is false.	1
21.	Ionic bond formation in between Magnesium and Oxygen $Mg \dashrightarrow Mg^{2+} + 2e^-$ $O + 2e^- \rightarrow O^{2-}$  **OR** $2Al + 6HCl \rightarrow 2AlCl_3 + 3H_2$ $Ca + 2HCl \rightarrow CaCl_2 + H_2$	1+1 1+1
22.	Movement of leaves of sensitive plant—No growth is involved -Fast response -Movement is reversible -Movement of shoot towards light -Growth is involved. -Slow response -Movement is irreversible. (ANY TWO POINTS)	**½ x 4**
23.	Bile salts break down fat into smaller globules increasing the efficiency of enzyme action.	1+1

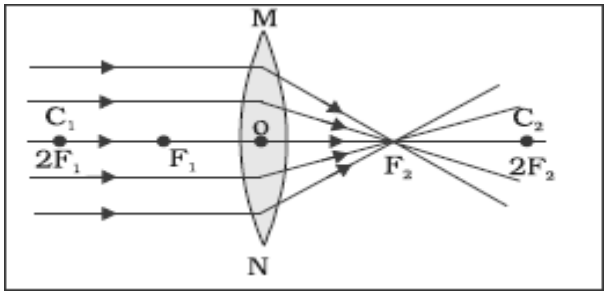
	---Makes the medium alkaline	
24.	Plants do not move, and plant bodies have a large proportion of dead cells in many tissues. As a result, plants have low energy needs.	1+1
25.	Diagram(figure-11.10, page 195) Explanation- Before actual sunrise the sun is below horizon. But due to atmospheric refraction it appears above horizon and we see sun before it actually rises. **OR** (a) $({}^{air}\mu_{prism}) = \frac{\lambda_{air}}{\lambda_{prism}}$ $({}^{air}\mu_{prism})_{red} = \frac{\lambda_{air}}{\lambda_{red}}$ $({}^{air}\mu_{prism})_{violet} = \frac{\lambda_{air}}{\lambda_{violet}}$ As $\lambda_{red} > \lambda_{violet}$ $({}^{air}\mu_{prism})_{violet}$ is more (b)Red	2 ½ ½ ½ ½
26.	These chemicals are not biodegradable; these get accumulated progressively at each trophic level. This phenomenon is known as biological magnification. This is the reason why our food grains contain varying amounts of pesticide residues.	**1+1**
27.	(a) $2Cu + O_2 + Heat \rightarrow 2CuO$ (b) Combination reaction / Redox reaction (c) $CuO + H_2 \rightarrow Cu + H_2O$, CuO is reduced to Cu	1 1 1
28.	(a) $X = CO_2$, $Y = NaHCO_3$, $Z = NH_4Cl$, $G = Na_2CO_3$ (b) $NaCl + H_2O + CO_2 + NH_3 \rightarrow NaHCO_3 + NH_4Cl$ $NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + CO_2 + H_2O$ Sodium Carbonate $Na_2CO_3 + 2HCl \rightarrow NaCl + H_2O + CO_2$ (any one of the above reaction)	0.5 x4 1
29.	(a) Due to the presence of valve (b) Body parts---vena cava---right atrium—right ventricle----pulmonary artery----lungs---pulmonary vein -- left atrium—left ventricle-- aorta—body parts. **OR** Through the pores present in the walls of capillaries some	1 2

	amount of plasma, proteins and blood cells escape into intercellular spaces in the tissues to form the tissue fluid or lymph. Lymph carries digested and absorbed fat from intestine and drains excess fluid from extra cellular space back into the blood.	1 1+1
30	(a) $-\frac{v}{u} = -1$ ⇨ v = u (object is at C) So 2f =40 cm ⇨ f= 20cm **Alternative Method** $-\frac{v}{u} = -1$ ⇨ v = u (object is at C) So v = -40cm , u = - 40 cm $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ $\Rightarrow \frac{-1}{40} + \frac{(-1)}{40} = \frac{1}{f}$ $\Rightarrow \frac{-2}{40} = \frac{1}{f}$ => f = - 20cm (b) Object distance = 40 cm – 25 cm = 15cm So the object is between F and O Image formed will be virtual erect (c)  Diagram NCERT BOOK page 166 fig 10.7 (f)	1 1 1 1
31.	(a) Myopia (b) Concave lens u = - ∞ ,v= -2m $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$	½ ½

	$\Rightarrow \frac{1}{-2} - \frac{1}{(-\infty)} = \frac{1}{f}$ $\Rightarrow \frac{1}{-2} = \frac{1}{f}$ ($\frac{1}{(\infty)} \rightarrow 0$) $\Rightarrow f = -2$ m $P = \frac{1}{f}$ $\Rightarrow P = \frac{1}{-2}$ $\Rightarrow P = -0.5$ D  (c) Correction for myopia Diagram NCERT BOOK page 189 fig 11.2 (c)	½ ½ 1
32.	(a)Displacement of the rod increases Reason :Force on a current carrying straight conductor placed inside a uniform magnetic field α Amount of current flowing through the rod (b) Displacement of the rod increases Reason : Force on a current carrying straight conductor placed inside a uniform magnetic field α length of the conductor (c) Displacement of the rod increases Reason : Force on a current carrying straight conductor placed inside a uniform magnetic field α strength of the magnetic field **OR** (a) deflection increases Reason :Strength of the magnetic field at point around a straight current carrying conductor is inversely proportional to the distance of the point from the conductor (b) deflection increases Reason :Strength of the magnetic field at point around a straight current carrying conductor is directly proportional to the amount of current flowing through	½ + ½ ½ + ½ ½ + ½ ½ + ½ ½ + ½

	the conductor (c) Deflection will be reversed Reason : The direction of the magnetic field will be reversed when the direction of current through the straight conductor is reversed	 ½ + ½
33.	(a) $O_2 \xrightarrow{UV} O + O$ $O + O_2 \longrightarrow O_3$ (b) CFC	**1+1** **1**
34.	A - C_2H_5OH, B - CH_3COOH, C - $CH_2=CH_2$, D - CH_3-CH_3   **OR** C - Ethanoic acid R - Sodium Ethanoate A - Methanol S - Methyl Ethanoate $CH_3COOH + Na \rightarrow CH_3COONa + H_2$ $CH_3COOH + CH_3OH \xrightarrow{H+} CH_3COOCH_3 + H_2O$ $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$ $CH_3COOCH_3 + NaOH \rightarrow CH_3COONa + CH_3OH$	4x 0.5 1 1 1 4x0.5 0.5 0.5 1 1
35.	(a) Vegetative part—Hyphae Reproductive part---Sporangium (b) Spore formation (c) The spores are covered by thick walls that protect them	**1** **1** **1** **2**

	until they come into contact with another moist surface and can begin to grow. **OR** (a) ---Multicellular organisms are well organised and specific cells perform specific activities ---Because they do not bear seeds. ----Variations accumulate and transmit to the next generation which enable them to survive in unfavourable condition. (b) Male gamete---Small in size., Motile, does not contain reserve food material, Female gamete—Larger in size, non-motile, Contain reserve food material. (ANY TWO POINTS)	**1** **1** **1** **½ x 4**
36.	(i) $\frac{R1}{R_2} = \frac{A2}{A_1}$ (Since Length and resistivity are Same) ⇨ $\frac{12}{R_2} = \frac{1}{3}$ ⇨ $R_2 = 36\ \Omega$. (thinner wire) (ii) $R_1=12\Omega$, (thicker wire) $R_2=36\ \Omega$ (thinner wire) $R_s = (12+36) = 48\Omega$ $\frac{1}{R_p} = (\frac{1}{R_1} + \frac{1}{R_2})^{-1}$ $= (\frac{1}{12} + \frac{1}{36})^{-1}$ $=(\frac{4}{36})^{-1}$ $R_p = 9\ \Omega$ (iii) (since $H = V^2/R$ and V is same here) $\frac{H_1}{H_2} = \frac{R_2}{R_1}$ $\frac{36}{12} = \frac{3}{1}$	1 ½ ½ ½ ½ ½ **1** ½
37.	(a) X - $CaCO_3$, Y - Ca (b) $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$ (c) Calcium Carbonate on heating in presence of limited supply of oxygen to form CaO .	1 1 1+1

	$CaCO_3 \xrightarrow{heat} CaO + CO_2$ OR (c)Ca is extracted by the electrolysis of molten $CaCl_2$. Ca is obtained from cathode and Cl_2 gas is obtained from anode. $Ca^{2+} + 2e^- \rightarrow Ca$ $2Cl^- \rightarrow Cl_2 + 2e^-$	1 1
38.	(a) 5643 (b) Rr (c) 1: 1 , Cross **OR** (c)75% --Round 25%--Wrinkled Cross	1 1 2 2
39.	(a)Convex lenses (b)L_2 will produce more convergent light (c)u = –15 cm f= +20 cm $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$ $\Rightarrow \frac{1}{v} = \frac{1}{20} - \frac{1}{15}$ $\Rightarrow \frac{1}{v} = \frac{3-4}{60}$ $\Rightarrow \frac{1}{v} = \frac{-1}{60}$ $\Rightarrow \frac{1}{v} = -60cm$ **OR** (C)  NCERT BOOK FIGURE Fig. 10.17.(a)	1 1 (½ + ½+ ½+ ½) **2**

Science (086)
Class-X
Sample Question Paper - 9 (2022-23)

Max. Marks: 80 **Time Allowed: 3 Hours**

General Instructions:

i. This question paper consists of 39 questions in 5 sections.

ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

iii. ***Section A*** *consists of 20 objective type questions carrying 1 mark each.*

iv. ***Section B*** *consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.*

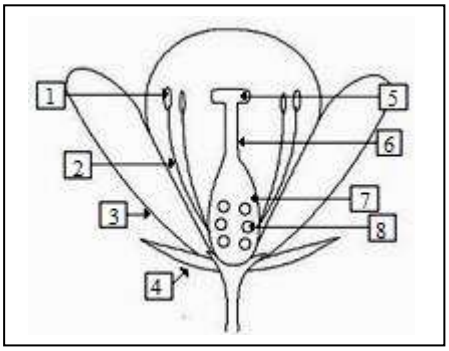
v. ***Section C*** *consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words*

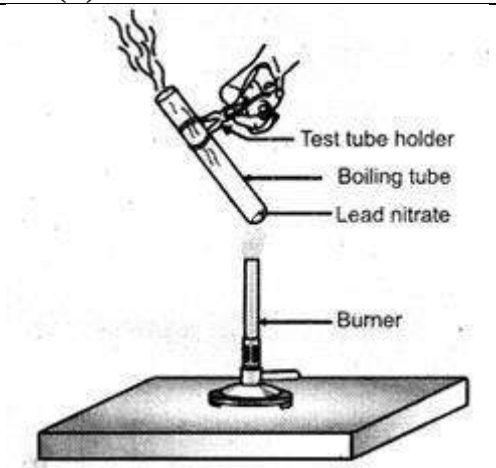
vi. ***Section D*** *consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*

vii. ***Section E*** *consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

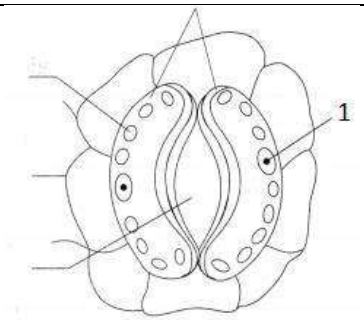
SECTION - A

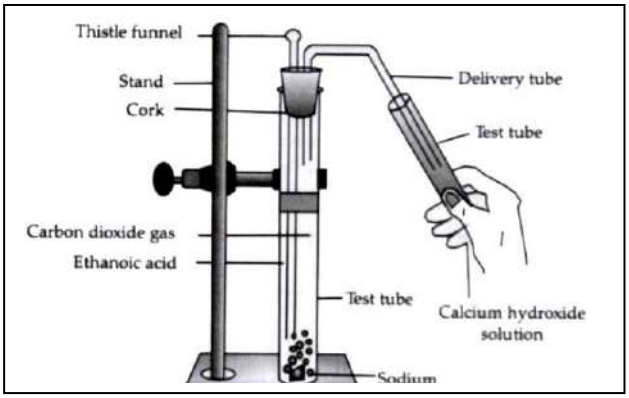
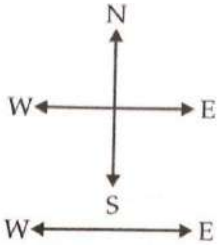
Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

Q. No	Questions	Marks
1	 Which process will likely be disturbed or not occur if the labelled 8 part is removed from the flower (a) Formation of fruit (b) Transport of pollen (c) Formation of pollen (d) Development of pollen tube	1

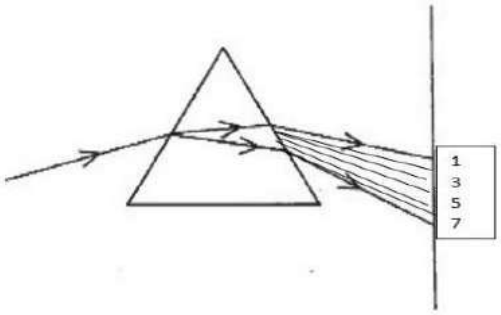
<table>
<tr><td>2</td><td>Exposure of silver chloride to sunlight for a long duration turns grey due to
(a) the formation of silver by decomposition of silver chloride
(b) sublimation of silver chloride
(c) Formation of chlorine gas from silver chloride
(d) oxidation of silver chloride</td><td>1</td></tr>
<tr><td>3</td><td> 

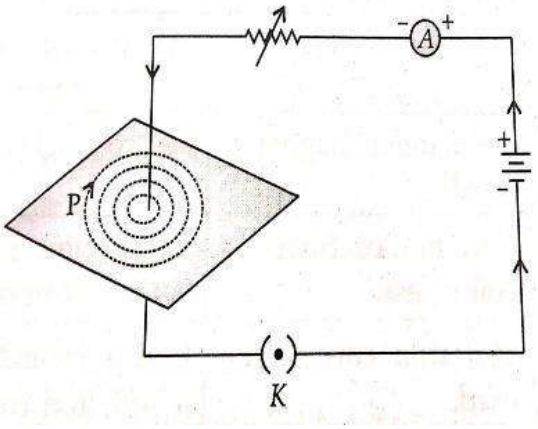
What is the colour of the gas and the salt respectively after heating
(a) Reddish brown and green
(b) Yellow and green
(c) Reddish brown and yellow
(d) Green and reddish brown</td><td>1</td></tr>
<tr><td>4</td><td>An acid „A“ with sodium bicarbonate is used in making the cakes fluffy and spongy. It is due to the release of „B“ gas in the reaction. Here, A and B are
(a) A : Oxalic acid, B : CO_2
(b) A : Tartaric acid, B : O_2
(c) A : Succinic acid, B: H_2
(d) A : Tartaric acid, B : CO_2</td><td>1</td></tr>
<tr><td>5</td><td>$Fe_2O_3 + 3\ CO \rightarrow 2Fe + 3\ CO_2$
Which one of the options in the table is correct?
<table>
<tr><th>Option</th><th>Oxidised Species</th><th>Reduced Species</th><th>Oxidising Agent</th><th>Reducing Agent</th></tr>
<tr><td>(a)</td><td>Fe_2O_3</td><td>CO</td><td>Fe_2O_3</td><td>CO</td></tr>
<tr><td>(b)</td><td>CO</td><td>Fe_2O_3</td><td>CO</td><td>Fe_2O_3</td></tr>
<tr><td>(c)</td><td>Fe_2O_3</td><td>CO</td><td>CO</td><td>Fe_2O_3</td></tr>
<tr><td>(d)</td><td>CO</td><td>Fe_2O_3</td><td>Fe_2O_3</td><td>CO</td></tr>
</table></td><td>1</td></tr>
<tr><td>6</td><td>A substance X forms salt and water with sulphuric acid and also react with zinc metal on heating to form hydrogen gas and their salt Y. the substances X and Y are respectively.
(a) NaOH and NaCl (b) NaOH and $ZnSO_4$
(c) NaOH and Na_2ZnO_2 (d) $Ca(OH)_2$ and $ZnSO_4$</td><td>1</td></tr>
</table>

7	The formula of two organic compounds is C_3H_8 and C_2H_2. Choose the correct option. (a) C_3H_8 is the 3rd member of alkane series and C_2H_2 is the second member of alkyne series (b) C_3H_8 is the 3rd member of alkane series and C_2H_2 is the second member of alkene series (c) C_3H_8 is the 3rd member of alkyne series and C_2H_2 is the first member of alkane series (d) C_3H_8 is the 3rd member of alkane series and C_2H_2 is the first member of alkyne series	1
8	 Identify label 1 of the diagram (a) Chloroplast (b) Nucleus (c) Vacuole (d) Stomata	1
9	Which of the following statement(s) is (are) true about respiration? i) During inhalation, ribs move inward and diaphragm is raised. ii) in the alveoli, exchange of gases takes place, i.e. Oxygen from blood into alveolar air iii)Haemoglobin has greater affinity for Carbon -di-oxide than oxygen. iv) Alveoli increase surface area for exchange of gases a) i and iv b) ii and iii c) i and iii d) iii and iv	1
10	In peas a pure tall (TT) is crossed with a pure short plant (tt). The ratio of pure tall plants to pure short plants in F_2 generation is (a) 1 :3 (b) 3 :1 (c) 1 :1 (d) 2 :1	1
11	Name the gland which secrets growth hormone.	1

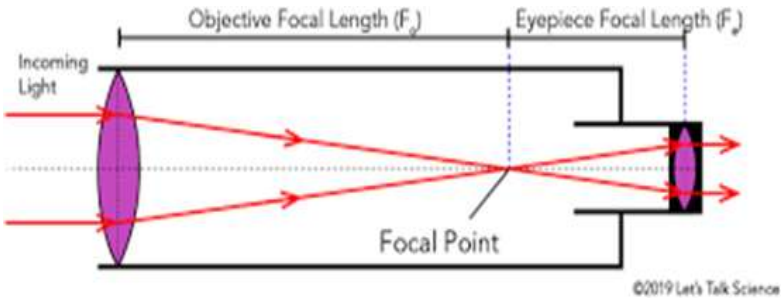
	(a) Thyroid (b) Pituitary (c) Adrenal (d) Salivary	
12	The solution of calcium hydroxide turns milky and then milkiness disappear due to the formation of  (a) Calcium Oxide and Calcium carbonate (b) Calcium Oxide and Calcium Bicarbonate (c) Calcium Carbonate and Calcium Bicarbonate Calcium bicarbonate and Calcium Oxide	1
13	Which of the following represents voltage? (a) Work done / (current X time) (b) Work done X charge (c) Work done X time/current (d) Work done X charge X time	1
14	 A constant current flows in a horizontal wire in the plane of paper from east to west as shown in the figure. The direction of magnetic field at a point will be north to south: (a) directly above the wire (b) directly below the wire (c) at a point located in the plane of paper, on the north side of the wire (d) at a point located in the plane of paper, on the south side of the wire	1
15	At the time of short circuit, the current in the circuit (a) Reduces substantially. (b) Does not change. (c) Increases heavily.	1

	(d)Vary continuously	
16	The strength of magnetic field inside a long current carrying straight solenoid is: (a) more at the ends than at the centre (b) minimum in the middle (c) same at all points (d) found to increase from one end to other	1
Q. no 17 to 20 are Assertion - Reasoning based questions. **These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:** **(a) Both A and R are true and R is the correct explanation of A** **(b) Both A and R are true and R is not the correct explanation of A** **(c) A is true but R is false** **(d) A is False but R is true**		
17	Assertion: Calcium carbonate on heating gives calcium oxide and carbon dioxide Reason: On heating calcium carbonate, displacement reaction takes place.	1
18	Assertion: A geneticist crossed two pea plants and got 50% tall and 50% dwarf in the progeny. Reason: One plant was heterozygous tall and other was dwarf.	1
19	Assertion: Energy is required to carry out different life processes. Reason: energy is obtained in the form of ATP in the mitochondria.	1
20	Assertion (A): The magnitude of the magnetic field at a point on the axis of a current carrying solenoid is inversely proportional to the current flowing through the solenoid. Reason (R): The magnitude of the magnetic field at a point on the axis of a current carrying solenoid is directly proportional to the number of turns per unit length of a solenoid.	1
SECTION – B Q. no. 21 to 26 are very short answer questions.		
21	Rohan have been provided with two test tubes. One of them contains solution having P^H 5 and the other contain solution having P^H 8. Rohan added methyl orange and phenolphthalein in both solutions one by one. What are the changes in colour that he has observed? **OR** (a) How is tooth decay related to pH? How can it be prevented? (b) Why does bee sting cause pain and irritation? Rubbing of baking soda on the sting area gives relief. How?	2
22	Give the differences between reflex arch and reflex actions.	2
23	State the location and function of gastric glands.	2
24	What is the remedial measure advised for the correction of acute renal failure?	2

25	 A beam of white light falling on a glass prism gets split up into seven colours marked 1 to 7 as shown in the diagram. A student makes the following statement about the spectrum observed on the screen. (a) Which two positions correspond closely to the colour of (i) a brinjal (ii) danger or stop signal lights? (b) Write the name of the phenomenon observed. **OR** (a) Define dispersion of light. (b) Draw the path of light ray passing through a prism. Label angle of incidence and angle of deviation in the ray diagram.	2
26	In the following food chain, 100J of energy is available to the lion. How much energy was available to producers? Plants → Deer → Lion	2
SECTION - C Q. No. 27 to 33 are short answer questions		
27	i. $KClO_3 \rightarrow KCl + O_2$ ii. $N_2 + 3H_2 \rightarrow NH_3$ iii. $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + NaCl$ Balance the above equations and mention the type of reaction.	3
28	Give reasons: (a) A milkman adds a very small amount of baking soda to fresh milk. (b) Plaster of Paris should be stored in a moisture-proof container. (c) A soda-acid type fire extinguisher contains sodium bicarbonate and sulphuric acid in separate container.	3
29	What is the functional role of the lymphatic system?	3
30	"A lens can form a magnified erect image as well as magnified inverted image of an object placed in front of it". State the nature of this lens and draw ray diagrams to justify the above statement. Mark the positions of O, F and 2F in the diagram	3
31	A person needs a lens of power – 4.5 D for correction of his/her	

	vision. (a) What kind of defect in vision is he/she suffering from? (b) What is the focal length of the corrective lens? (c) What is the nature of the corrective lens?	3
32	It is established that an electric current through a metallic conductor produces a magnetic field around it. Is there a similar magnetic field produced around a thin beam of moving: (a)Alpha particles (b) electrons (c) neutrons? Justify your answer in each case. **OR**  The diagram shown here illustrates the pattern of magnetic field lines of magnetic field around a current carrying straight conductor. (a) State the rule used to find the direction of magnetic field lines around the wire. (b) What change is observed in the pattern of field lines if the polarity of the source battery is reversed? (c) How wills the deflection on a compass needle gets affected if the needle moves away from the conductor?	3
33	(a) Which gas shields the surface of earth? (b) Give an example to illustrate that in discriminate use of pesticides may result in the degradation of the environment.	3
SECTION - D Q.no. 34 to 36 are Long answer questions.		
34	(a) Write the formula and draw the electron dot structure of first member of alkene series. (b)What is saponification? Write the reaction involved in the process. (c)Define catenation. **OR** (a)Elements forming ionic compounds attain noble gas electronic configuration by either gaining or losing electrons from	5

	their valence shells. Explain giving reason why carbon cannot attain such a configuration in this manner to form its compounds. (b) Name the following compounds. CH_3-CH_2-OH and CH_3-CH_2-CH_2-CHO (c)What is homologous series of carbon compounds?	
35	(a) The organism formed by asexual reproduction is considered as clones. Why? (b) State the advantage of sexual reproduction over asexual reproduction. (c) What is the site of implantation? **OR** (a) What are variations? How are they important for species? (b) Describe the significance of fertilization in humans.	5
36	Explain the following. a. Why is the tungsten used almost exclusively for filament of electric lamps? b. Why are the conductors of electric heating devices, such as bread-toasters and electric irons, made of an alloy rather than a pure metal? c. Why is the series arrangement not used for domestic circuits?	5
SECTION - E Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.		
37	Metals react with non-metals by losing or gaining of electrons. $MgCl_2$ is formed by transfer of electron from magnesium to chlorine. Ionic compounds are usually solid and hard in nature. They are generally soluble in water and insoluble in petrol, kerosene, etc. the melting and boiling point of ionic compounds are high. (a) What do you mean by ionic bond? (b) Why do ionic compounds are solid and hard in nature? (c)Draw the Lewis dot structure of formation of $MgCl_2$ **OR** (c) The atomic number of four elements A, B, C and D are 6, 9, 10 and 11 respectively. Which of the two elements can form ionic compounds are and what is the formula of the ionic compound.	4
38	In a cross between plants with purple flowers and plants with white flowers, the offspring of F_1 generation had all white flowers. When F_1 generations individuals were self breed, the F_2 generation gave rise to 100 individuals, 75 of which had white flowers. (a) What are genotype of F_2 individuals ? (b) What is the ratio of white to purpled plants in F_2	4

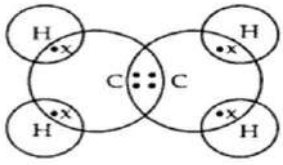
	generation? (c) Make a cross **OR** (d) Why did Mendel select pea plants for conducting his experiments on inheritance?	
39	 Suman wanted to see the stars of night sky. She knows that she needs a telescope to see those distant stars. She finds out that telescopes, which are made of lenses are called refracting telescope, the ones which are made of mirrors are called reflecting telescopes. So she decided to make a refracting telescope. She bought two lenses out of which one is bigger and another is smaller. The larger lens gather and bend the light while the smaller lens magnifies the image. Big, thick lenses are more powerful. So to see far away, she needed a big powerful lens. Unfortunately She realized that a big lens is very heavy. Heavy lenses are hard to make and difficult to hold in the right place. Also since the light is passing through the lens, the surface of the lens has to be extremely smooth. Any flaws in the lens will change the image. It would be like looking through a dirty window. (a) Based on the diagram shown, what kind of lenses Suman need to make telescope? (b) If the power of objective lens and eyepiece lens are in the ratio 4:1. What will be the ratio of focal length of objective lens and eyepiece lens. (c) Suman did some preliminary experiments with the lenses and found out that the magnification of eyepiece lens is 3.If in her experiment with eyepiece she found an image at 24 cm from the lens, what distance did she put the object ? OR (c)Draw a ray diagram to show image formation by a concave mirror when a ray of light incident parallel to the principal axis.	4

SCIENCE (086)
CLASS X
Sample Paper – 9 (2022-23)
Marking Scheme

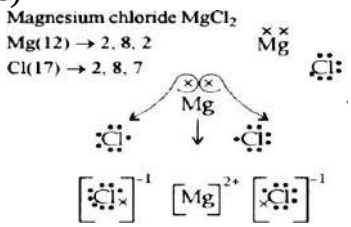
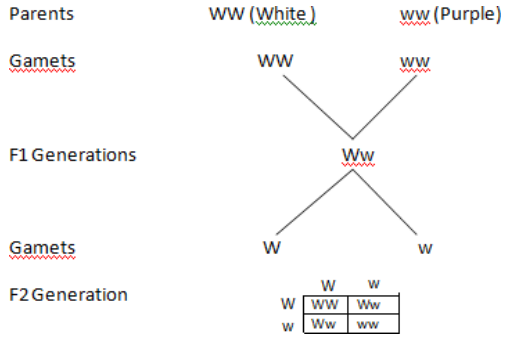
<table>
<tr><th>Q.No.</th><th>VALUE POINTS</th><th>Marks</th></tr>
<tr><td colspan="3">Section A</td></tr>
<tr><td>1.</td><td>(a) Formation of fruit</td><td>1</td></tr>
<tr><td>2.</td><td>(a) the formation of silver by decomposition of silver chloride</td><td>1</td></tr>
<tr><td>3.</td><td>(c) Reddish brown and yellow</td><td>1</td></tr>
<tr><td>4.</td><td>(d) A : Tartaric acid, B : CO_2</td><td>1</td></tr>
<tr><td>5.</td><td>(d)
<table>
<tr><td>Oxidised Species</td><td>Reduced Species</td><td>Oxidising Agent</td><td>Reducing Agent</td></tr>
<tr><td>CO</td><td>Fe_2O_3</td><td>Fe_2O_3</td><td>CO</td></tr>
</table></td><td>1</td></tr>
<tr><td>6.</td><td>(c) NaOH and Na_2ZnO_2</td><td>1</td></tr>
<tr><td>7.</td><td>(d) C_3H_8 is the 3rd member of alkane series and C_2H_2 is the first member of alkyne series</td><td>1</td></tr>
<tr><td>8.</td><td>(b) Nucleus</td><td>1</td></tr>
<tr><td>9.</td><td>d) iii and iv</td><td>1</td></tr>
<tr><td>10.</td><td>(c) 1:1</td><td>1</td></tr>
<tr><td>11.</td><td>(b) Pituitary</td><td>1</td></tr>
<tr><td>12.</td><td>(c) Calcium Carbonate and Calcium Bicarbonate</td><td>1</td></tr>
<tr><td>13.</td><td>(a)Work done / (current X time)</td><td>1</td></tr>
<tr><td>14.</td><td>(b) directly below the wire</td><td>1</td></tr>
<tr><td>15.</td><td>(c) Increases heavily</td><td>1</td></tr>
<tr><td>16.</td><td>(c) same at all points</td><td>1</td></tr>
<tr><td>17.</td><td>(c) A is true but R is false</td><td>1</td></tr>
<tr><td>18.</td><td>(a) Both A and R are true and R is the correct explanation of A</td><td>1</td></tr>
<tr><td>19.</td><td>(a) Both A and R are true and R is the correct explanation of A</td><td>1</td></tr>
<tr><td>20.</td><td>c) A is false but R is true</td><td>1</td></tr>
<tr><td colspan="3">Section B</td></tr>
<tr><td>21.</td><td>
<table>
<tr><td>Indicator</td><td>$P^H = 5$</td><td>$P^H = 8$</td></tr>
<tr><td>Methyl Orange</td><td>Orange red</td><td>Yellow</td></tr>
<tr><td>Phenolphthalein</td><td>Colourless</td><td>Pink</td></tr>
</table>
OR
(a) Lower the pH more will be tooth decay. Acid reacts with $Ca_3 (PO_4)_2$ and cause tooth decay.
It can be prevented by brushing teeth after every meal.</td><td>2

1</td></tr>
</table>

	(b) It is due to formic acid. Sodium hydrogen carbonate neutralizes formic acid giving relief.	1
22.	Reflex action is an involuntary unplanned sequence or action and nearly instantaneous movement in response to a stimulus. Reflex arc is the nerve pathway involved in a reflex action, including at its simplest a sensory nerve and a motor nerve with a synapse between.	2
23.	Gastric glands are present in the wall of stomach. It secretes gastric juices containing mucus, protein digestive enzymes pepsin, rennin and Hydrochloric acid.	2
24.	In acute renal failure, kidney transplantation is the ultimate correction. Kidney is transplanted from a donor having functional kidney, a close relative preferably, so that chances of rejection by the host immune system are minimized.	2
25.	(a) i – 7 , ii - 1 (b) dispersion of light **OR** (a) Correct definition (b)Correct ray diagram	1 1 1 1
26.	As per 10% law of flow of energy in an ecosystem, only 10% of energy is received by the next trophic level. If 100% J of energy is available to the lion, the plants or producers have 10,000 J of energy available to them. Plants $\rightarrow$ Deer $\rightarrow$ Lion 10,000 1000 100	2
Section C		
27.	i. $2KClO_3 \rightarrow 2KCl + 3O_2$ (Decomposition) ii. $N_2 + 3H_2 \rightarrow 2NH_3$ (Combination) iii. $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$ (Double Displacement)	1 1 1
28.	(a) The milkman adds baking soda to shifts the P^H from 6 to alkaline, so that milk does not set as curd easily. (b) Because plaster of paris reacts with water to form a hard solid mass called gypsum. (c) The glass container containing sulphuric acid breaks and reacts with sodium hydrogen carbonate and form CO_2 and H_2O that extinguishes fire.	1 1 1
29.	i. Conversion of toxic ammonia into urea that is later eliminated by the kidney. ii. The liver generates protein such as fibrinogen which are passé through the circulation of blood. iii. Excess glucose and fats are utilized by the liver during starvation.	1 1 1

30.	Convex lens Correct ray diagram for each case Marking of position	½ 1+1 ½
31.	(a) Myopia (b) f = 1/P = 100/4.5 = 22.2 cm (c) Concave lens	1 1 1
32.	(a) Yes, (b) Yes (c) No with proper justification **OR** (a) Statement of RHT rule (b) Anticlockwise (c) decreases	1 1 1 1 1 1
33.	(a) Ozone (b) The pesticides used in crop field washed down into the water bodies. From water bodies, there are absorbed by the aquatic plants and animals of a food chain and there by degrades the environment.	1 2
Section D		
34.	(a) formula – C_2H_4  (b) The hydrolysis of ester in presence of an alkali to form sodium salt of carboxylic acid and alcohol. $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$ (c) The property of any element to combine with other atoms of its own kind to form long chain or rings. **OR** (a) Carbon has to lose 4 electrons which required large amount of energy or if it gains 4 electrons it becomes difficult for the nucleus with 6 protons to hold up 10 electrons. (b) CH_3-CH_2-OH = Ethanol, CH_3-CH_2-CH_2-CHO = Butanal (c) A series of compounds having same functional group and each compound differing by a CH_2 unit from the successive member.	2 2 1 2 2 1
35.	(a) The organism formed by asexual reproduction are considered as clone because they are genetically similar to one another as well as their parent. (b) Sexual reproduction is advantageous over asexual reproduction as it produces a lot of variations due to reshuffling	2 2

	of chromosomes and crossing over. This provides better adaptability, more vigour and vitality to the offspring. (c) Uterus **OR** (a) Variations can be defined as the variations in DNA sequences. It makes one organism different from the other organism. Variations are essential for natural selection. Variations help organism to adopt in the environment and prevent extinction of a species. (b) From the point of view of evolution fertilization in humans brings about whole new range of genes in the world. The results of reproduction are the combination of genes of the humans involved in the process of fertilization. This combination of genes helps humans to adapt changes in their environment. The constant shuffling of genes in the gamete cells increases the variations in the offspring of the humans. Different chromosomes combinations allow the offspring receive variation in the course of time. This gives ideas that evolution is necessary to allow future progenies to thrive and functions in the new world as per the needs of changing environment. Thus fertilization in humans is highly significant to the human race.	1 2 3
36.	a) The resistivity and melting point of tungsten is very high. Due to this property, it doesn't burn readily when heated. Electric lamps operate at high temperature. Hence, tungsten is a choice of metal for the filament of electric lamps. b) The conductors of electric heating devices are alloys because of their high resistivity. Alloys have higher resistivity than pure metals. Due to its high resistivity, a large amount of heat is produced when current passes through it. c) The series arrangement is not used for domestic circuits due to the following reasons: The overall voltage gets distributed in a series circuit. As a result, electric appliances may not get the rated power for their operation. All the connected appliances cannot be operated independently. If one device is defective, then the entire circuit will not function. The total resistance becomes large, and as a result, the current is reduced.	1 1 3
Section E		
37.	(a) The electrostatic force of attraction between two oppositely charge ions formed by transfer of electron from one atom to another is called ionic bond. (b)Due to strong force of attraction between the ions.	1 1

	(c)  Magnesium chloride $MgCl_2$ Mg(12) → 2, 8, 2 Cl(17) → 2, 8, 7 **OR**	2
	(c) D and B can form ionic bond. One electron will transfer from D to B and the formula of the compound will be DB.	2
38.	(a) Genotypes of 1: 2:1 (b) Ratio is 3 :1 (c)  Parents WW (White) ww (Purple) Gamets WW ww F1 Generations Ww Gamets W w F2 Generation **OR** (c) i. Many varieties of pea plants are available with observable contrasting characters. ii. peas are normally self pollination and flower structure is also suitable for cross pollination	1 1 2 2
39.	a) Convex lenses b) 1:4 c) m= v/u, 3=24/u, so u= 8 cm **OR** c) ray diagram	1 1 2 2

SCIENCE (086)
CLASS-X
Sample Question Paper – 10 (2022-23)

Max. Marks: 80 **Time Allowed: 3 Hours**

General Instructions:

i. *This question paper consists of 39 questions in 5 sections.*
ii. *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
iii. *Section A consists of 20 objective type questions carrying 1 mark each.*
iv. *Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.*
v. *Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words*
vi. *Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*
vii. *Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts*

	SECTION - A Select and write one most appropriate option out of the four options given for each of the questions 1 – 20	
1	When a cross between two individuals gives the ratio 9:3:3:1. This cross is an example of a) Cross pollination b) Monohybrid cross c) Dihybrid cross d) Self-pollination	1
2	On immersing an iron nail in $CuSO_4$ solution for a few minutes, you will observe a) No reaction takes place. b) The solution becomes colourless. c) The surface of iron nails acquires a black coating. d) The colour of solution changes to green.	1
3	Which of the following statements about the given reaction are correct? $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$ (A) Iron metal is getting oxidized. (B) Water is getting reduced.	1

	(C) Water is acting as reducing agent. (D)Water is acting as oxidizing agent. a) (A), (B) & (C) b) (C) & (D) c) (A), (B) & (D) d) (B) & (D)	
4	Mixing an acid or base with water results in decrease in the concentration of per unit volume. This process is called? a) Dilution b) Reaction c) Neutralisation d) Saturation	1
5	We store silver chloride in a dark coloured bottle because it is a) A white solid. b) Undergoes redox reaction. c) To avoid action by sunlight. d) None of the above	
6	Applying traces of mild base like ..... on the bee-stung area gives relief. a) Tartaric acid b) Lemon joule c) Baking Soda d) Vinegar	1
7	Chemical formula of washing soda is a) $Na_2C0_3 . 7H_2O$ b) $Na_2C0_3 . 5H_2O$ c) $Na_2C0_3 .2H_2O$ d) $Na_2C0_3 . 10H_2O$	1
8	Sometimes we get painful cramps in our leg muscles after running for a long time due to the accumulation of: a) Hydrochloric acid b) Fat c) Carbon dioxide d) Lactic acid	1
9	Identify the secretion of gastric juice that helps in protecting the inner lining of the stomach from the harmful effect of hydrochloric acid. a) Mucus b) Pepsin	1

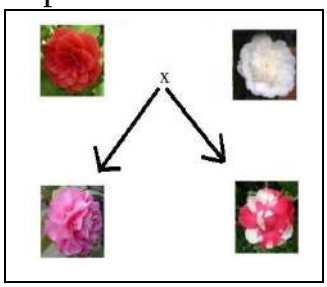
	c) Trypsin d) Bile	
10	Identify from the following solution that has more H^+ ion concentration. (a) 100ml Concentrated ethanoic acid (b) 100ml Concentrated Sodium carbonate (c) 100ml of dilute Hydrochloric acid (d) 100ml of dilute tartaric acid	1
11	The hormone in plants that acts as a growth inhibitor a) Auxin b) Cytokinin c) Gibberellin d) Abscisic Acid	1
12	During favourable conditions, Amoeba reproduces by a) multiple fission b) binary fission c) budding d) fragmentation	1
13	A boy records that 4000 joules of work is required to transfer 10 coulomb of charge between two points of a resistor of 50 Ω. The current passing through it is (a) 2 A (b) 4A (c) 8A (d) 16 A	1
14	A positive charge is moving towards a person. The direction of magnetic field lines will be in (a) Clockwise direction (b) Anticlockwise direction (c) Vertically upward direction (d) Vertically downward direction	
15	Which of the given statements is not true, regarding the electrical set-up for the verification of Ohm's law: a) The voltmeter is connected in parallel with the known resistance. b) The ammeter is connected in series circuit. c) The rheostat can only increase the resistance in electric circuit. d) The single key is used to switch on/off the electric circuit.	1

16	For a current in a long straight solenoid N- and S-poles are created at the two ends. Among the following statements, the incorrect statement is a) The field lines inside the solenoid in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid. b) The strong magnetic field produced inside the solenoid can be used to magnetize a piece of magnetic material like soft iron, when placed inside the coil. c) The pattern of magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet. d) The N- and S- poles exchange position when the direction of current through the solenoid is reversed.	1
	Q. no 17 to 20 are Assertion - Reasoning based questions. These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true and R is not the correct explanation of A. c) A is true but R is false. d) A is False but R is true.	
17	Assertion (A): Carbon possesses property of catenation. Reason (R): Carbon atoms form double as well as triple bonds during catenation.	1
18	Assertion (A): A geneticist crossed two pea plants and 50 % tall and 50 % dwarf in the progeny Reason (R) : One plant was heterozygous tall and other was dwarf.	1
19	Assertion (A): Plants lack excretory organs. Reason (R): Plants usually absorb essential nutrients.	1
20	Assertion (A): A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the compass needle is displaced away from the wire. Reason (R): Strength of a magnetic field decreases as one moves away from a current carrying conductor.	1

	SECTION – B Q. no. 21 to 26 are very short answer questions	
21	A white coloured powder is used by doctors for supporting fractured bones. a) Write chemical name and formula of the powder. b) When this white powder is mixed with water a hard solid mass is obtained. Write the balanced chemical equation for the change OR Ammonical aqueous solution of a salt '**X'** when treated with Carbon dioxide gives a sodium compound '**Y'** which is used in fire extinguisher. Write the common name and chemical formula of compound Y. State the chemical equation for the preparation of Y.	2
22	Name the hormones responsible for regulation of (i) Metabolism of carbohydrates, fats and proteins. (ii) Helps in growth and development of body. (iii) Blood pressure. (iv) Lowers blood sugar level.	2
23	Name the term used for the loss of water from areal part of plant in the form of water vapour and state its advantages. OR Write two ways by which plants excrete their waste.	2
24	Give one reason why multicellular organisms require special organs for exchange of gases between their body and their environment.	2
25	Write the function of each of the following parts of human eye: (i) Cornea (ii) Iris (iii) Crystalline lens (iv) Ciliary muscles OR A student is unable to see clearly the words written on the black board placed at a distance of approximately 3 m from him. Name the defect of vision the boy is suffering from. State the possible causes of this defect and explain the method of correcting it.	2
26	What is ozone and how does it affect any ecosystem?	2
	SECTION - C Q.no. 27 to 33 are short answer questions.	
27	What happens when an aqueous solution of sodium sulphate reacts with an aqueous solution of barium chloride? State the physical conditions of reactants in which the reaction between them will not take place. Write the balanced chemical equation for the reaction and name the type of reaction.	
28	Kamla was playing in the garden. She was stung by a wasp and started crying. Her mother immediately applied a coating of tooth paste on the	3

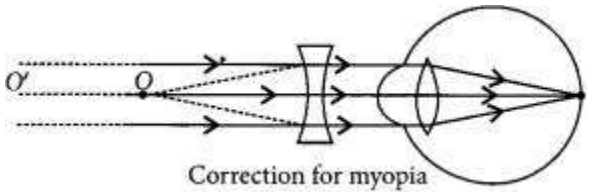
	affected area and then took her to the doctor. a) What does wasp sting contain? b) Why did her mother apply tooth paste on the affected area?	
29	Mention the substances that are transported by the following channels/vessels respectively. (i)Xylem (ii)Phloem (iii)Pulmonary vein (iv)Vena cava (v)Pulmonary artery (vi) Aorta OR In the human alimentary canal, name the site of complete digestion of various components of food. Explain the process of digestion.	3
30	A spherical mirror produces an image of magnification -1 on a screen placed at a distance of 30 cm from the mirror. a) Find the distance of the object from the object. b) What is the focal length of the mirror? c) Draw the ray diagram to show the image formation in this case.	3
31	How will you use two identical glass prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light?Draw and label the ray diagram.	3
32	a. Represent the magnetic field produced by a current carrying straight conductor in a diagram. b. Name and state the rule to find out the direction of magnetic field around a straight conductor carrying current. **OR** a. Draw the magnetic field lines produced by a current carrying solenoid with its correct poles. b. Conclude the nature of the magnetic field produced inside this current carrying solenoid with reason.	3
33	What is biological magnification? Will the levels of this magnification be different at different levels of the ecosystem? Give reason.	3

	SECTION - D Q.no. 34 to 36 are long answer questions.	
34	a) Distinguish between 'roasting' and 'calcination'. b) A copper plate was dipped into a solution of AgNO3. After sometime, a black layer was deposited on the copper plate. State the reason for it. Write the chemical equation for the reaction involved OR a) Write the chemical name of the coating that forms on silver and copper articles when these are left exposed to moist air. b) Explain galvanisation. What purpose is served by it? c) Define an alloy. How are alloys prepared? How do the properties of iron change when: (i) small quantity of carbon, (ii) nickel and chromium are mixed with it.	5
35	a) Name the sex hormone associated with males. b) Testes are located outside the abdominal cavity in scrotum. Give reason. c) State the importance of the prostate gland and seminal vesicle with release of sperm. d) Male genital organ is also known as urinogenital organ. State the reason. **OR** (a) What is contraception? (b) Why is child sex- ratio declining at an alarming rate in India? (c) Write the names of any two contraceptive methods. (d) How can unwanted pregnancies be terminated? Name the technique used for pre-natal sex determination.	5
36	(i) Draw a schematic diagram of a circuit consisting of a battery of five 2 V cells, a 5 Ω resistor, a 10 Ω resistor and a 15 Ω resistor and a plug key all connected in series. (ii) Calculate the electric current passing through the above circuit when the key is closed. (iii) Potential difference across 15 Ω resistor.	5
	SECTION - E Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.	
37	**Read the following and answer any four questions from (i) to (v)** Metals as we know, are very useful in all fields, industries. Non-metals are no less in any way. Oxygen present in air is essential for breathing as well	4

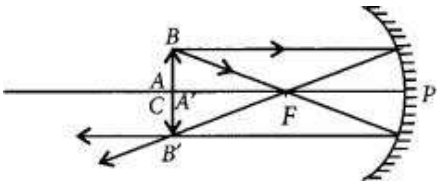
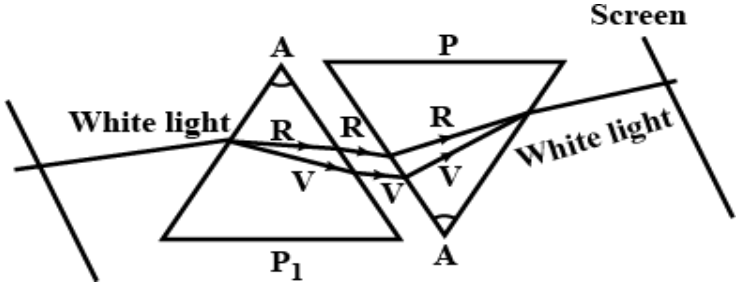
	as for combustion. Non- metals form a large number of compounds which are extremely useful, e.g , ammonia, nitric acid, sulphuric acid etc. Non- metals are found to exist in three states of matter. Only solid non-metals are expected to be hard however, they have low density and are brittle. They usually have low melting and boiling points and are poor conductors of electricity. a) Name the acid which is known as 'king of chemicals'. b) Name a non-metal which is liquid at room temperature. c) If copper is kept exposed to damp air, it develops a green coating on its surface. Write the change in colour and chemical name of coating. **OR** c) Which metals kept in kerosene and why?	
38	In a monohybrid cross between a plant having red flower is crossed with a plant having a white flower. Both the parents are pure varieties. Each organism has two alleles received one from each parent. The allele which displays its effect is called a dominant trait and which cannot express is called a recessive trait. Sometimes, neither of the allele is completely dominant over the opposite. As a result a different phenotype is formed. In some other cases, both the alleles cannot block the expression of each other.  Refer the above passage and diagram to answer the following : (a) In pure varieties, the alleles are similar. What is it called as? (b) When 'RR' crossed with 'rr' it gave rise to 'Rr' in F_1 generation. As per law of dominance, what will be the phenotypic and genotypic in F_2 generation? (c) In the above diagram, the two different colored flowers are shown in F_1 generation. Name the two phenomena they display. OR **(c)** Based on the above example in the paragraph, draw a Punnett Square showing the F_1 and F_2 generations.	4

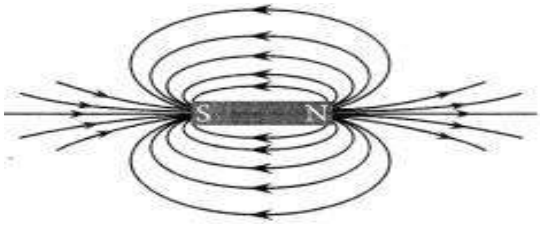
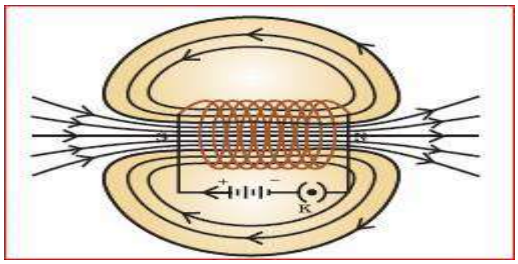
39	The spherical mirror forms different types of images when the object is placed at different locations. When the image is formed on screen, the image is real and when the image does not form on screen, the image is virtual. When the two reflected rays meet actually, the image is real and when they appear to meet, the image is virtual. A concave mirror always forms a real and inverted image for different positions of the object. But if the object is placed between the focus and pole. the image formed is virtual and erect. A convex mirror always forms a virtual, erect and diminished image. A concave mirror is used as doctor's head mirror to focus light on body parts like eyes, ears, nose etc., to be examined because it can form erect and magnified image of the object. The convex mirror is used as a rear view mirrors in automobiles because it can form an small and erect image of an object. (a) Which mirror is used to get the full length image of a distant tall building? (b) Where should the bulb be placed in torches, search lights and headlights of vehicles? (c) Size of image of an object by a concave mirror having a focal length of 20cm is observed to be reduced to 1/3rd of its size. At what distance the object has been placed from the mirror? OR (c) Refractive index of diamond with respect to glass is 1.6 and absolute refractive index of glass is 1.5. Find out the absolute refractive index of diamond.	4

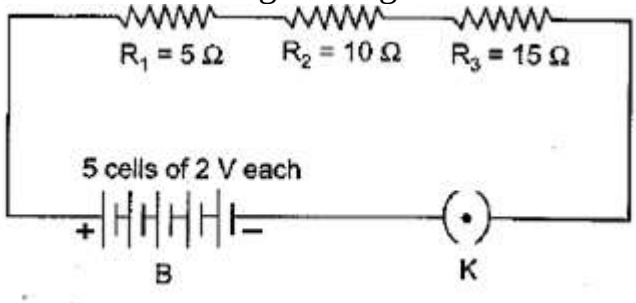
	SCIENCE **(086)CLASS-X** **Sample Question Paper – 10 (2022-23)** **Marking Scheme**	
	SECTION - A **Select and write one most appropriate option out of the four optionsgiven for each of the questions 1 – 20**	
1	c)Dihybrid cross	1
2	d) The color of solution changes to green	1
3	c) (A), (B) & (D)	1
4	a) Dilution	1
5	c) To avoid action by sunlight	1
6	c) baking soda	1
7	d) $Na_2C0_3 . 10H_2O$	1
8	d) Lactic acid	1
9	a) Mucus	1
10	(c) 100ml of dilute Hydrochloric acid	1
11	d) Abscisic Acid	1
12	b) binary fission	1
13	(c) 8A	1
14	b) Anticlockwise direction	1
15	c)The rheostat can only increase the resistance in electric circuit	1
16	c) The pattern of magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.	1
17	b) Both A and R are true but R is not the correct explanation of A.	1
18	a)Both A and R are true and R is the correct explanation of A	1
19	(b) Both A and R are true and R is not the correct explanation of A	1
20	(a) Both A and R are true and R is the correct explanation of A.	1
	SECTION – B **Q. no. 21 to 26 are very short answer questions**	
21	(a) Chemical name – Calcium sulphate hemihydrate Formula - $CaSO_4 1\frac{1}{2}H_2O$ (b) $CaSO_4 1\frac{1}{2}H_2O + 1\frac{1}{2}H_2O \rightarrow CaSO_4.2H_2O$ OR Baking soda, $NaHCO_3$ $NaCl + H_2O + CO_2 + NH_3 \rightarrow NaHCO_3 + NH_4Cl$	1 1 1 1

22	(i)Thyroxin (ii)Growth hormone (iii)Adrenaline (iv) Insulin	0.5x4
23	Transpiration . Advantages-(i) Helps in excreting excess water. (ii)Helps in transportation of water and mineral. (iii)Maintain the temperature of plant OR The two ways by which plants excrete their waste are- Through old xylems By transpiration and respiration.	1 0.5 0.5 1 1
24	Simple diffusion is not sufficient for the exchange of gases in multi cellular organisms as all their cells are not in direct contact with the environment. So, they require special organs for exchange of gases between their body and their environment.	1 1
25	(i) Cornea: It is a transparent bulge on the front surface of eyeball which refracts most of the light rays. (ii) Iris : Iris is a dark muscular diaphragm that controls the size of the pupil. (iii) Crystalline lens: The crystalline lens of human eye focuses the light that enters the eye and forms the image on the retina. (iv) Ciliary muscles: Ciliary muscles hold the eye lens and helps in the adjustment of its focal length. **OR** Student is suffering from myopia. The two possible reasons due to which the defect of vision arises are : excessive curvature of the eye lens and elongation of the eye ball. Correction of myopia: This defect can be corrected by using a concave lens of suitable power as it brings the image back on to the retina, thus the defect is corrected.  Correction for myopia	½ x 4 ½ ½ + ½ ½

26	Ozone (O_3) is an isotope of oxygen, i.e., it is a molecule formed by three atoms of oxygen. At the higher levels of the atmosphere, ozone performs an essential function. It shields the surface of the earth from ultraviolet (UV) radiations from the sun. These radiations are highly damaging to organisms. Ultraviolet rays can cause skin cancer.	1 1
	SECTION - C Q.no. 27 to 33 are short answer questions.	
27	a) precipitate of barium sulphate forms. b) The reaction will not take place, if the reactants are in solid state. c) $Na_2SO_4(aq)+BaCl_2(aq)\rightarrow BaSO_4(s)+2NaCl(aq)$ and 'Double Displacement Reaction.	1 1 1
28	a) Wasp sting contains in it formic acid (HCOOH) b) Tooth paste contains in it some basic ingredients which neutralise the effect of formic acid (HCOOH) and give relief.	1 2
29	(i) Xylem is a specialized plant conducting tissue that transports water and minerals from roots to all aerial parts of plants which occurs against gravitational force with the help of ascent of sap. (ii) Phloem transports food that is prepared in the leaves, through photosynthesis, to various parts of plant. This process is called translocation. Phloem also transports amino acids, hormones synthesized in the shoot tips and root tips and other metabolites. (iii) Pulmonary vein present in human circulatory system brings oxygenated blood from lungs to the left atrium of heart. (iv) Vena cava transport deoxygenated blood collected by all veins of body except pulmonary vein and pass it to the right atrium of heart. (v) Pulmonary artery transports deoxygenated blood from right atrium of heart to lungs for oxygenation. (vi) Aorta transports oxygenated blood from left atrium to systemic arteries which further take the blood to various body parts and organs. **OR** Site of Complete Digestion. Small intestine. Digestion. It is the conversion of complex insoluble food ingredients into simple absorbable form. Digestion is essential as complex	6 x ½ 1

	components of food cannot pass into body cells for nourishment. Digestion occurs with the help of digestive enzymes. In simple holozoic animals, it is intracellular. In higher animals digestion is performed in a digestive tract and is, therefore, intercellular or extracellular. The digested materials are absorbed, transported and picked up by individual cells of the body for assimilation.	1 1
30	(i) Distance the image from the mirror = – 30 cm Magnification, m = −v/u Here m = – 1 and v = – 30 cm -1 = – (−30)u ∴ u = – 30 cm As v = u, object is placed at centre of curvature. Therefore, focal length of the mirror, f = −30/2 = – 15 cm (ii) Image formed is real and inverted and of the same size of the object. (iii)(iii)  	1 1 1
31	When two identical inverted prisms are kept closed to each other the white light disperses in first prism into seven colours and allowed all the colours of the white light to pass through the second prism combining to form a white light emerging from the other side of the second prism.  	4 X ½ 1

32	a)  b) Magnetic field lines are closed and continuous curves . Magnetic field lines do not intersect each other . OR (a) A coil of many circular turns of insulated copper wire wrapped closely in the shape of cylinder is called solenoid. (b)Strength of magnetic field produced by a current carrying solenoid depends upon the following factors: • number of turns per unit length in the coil • amount of current flowing through it (c) Correct diagram 	2 1 1 1 1
33	Biological magnification: The increase in concentration of harmful chemical substances like pesticides in the body of living organisms at each trophic level of a food chain is called biological magnification. Yes, levels of bio-magnification would increase as the trophic level increases and would be the highest for topmost trophic level. It would affect their biological process such as growth, reproduction, etc.	1 1 1
	SECTION - D Q.no. 34 to 36 are long answer questions.	
34	(a) Write Any two difference	2

	(b) because copper is more reactive than silver and hence displaced silver from silver nitrate solution. $2AgNO_3(aq)+Cu(s)\rightarrow Cu(NO_3)_2(aq)+2Ag(s)$	2 1
	OR	
	(a) Ag_2S (silver sulphide) is formed on silver, basic copper carbonate $CuCO_3$. $CU(OH)_2$ is formed on copper. (b) The process of coating zinc over iron is called galvanisation. It is used to prevent rusting of iron. (c) Alloy is a homogeneous mixture of two or more metals. One of them can be non-metal. Alloys are prepared by melting two or more metals together. Iron does not rust on adding small, quantity of carbon. (ii) When we form alloy of iron with nickel and chromium, we get stainless steel which is malleable and does not get rusted.	2 1 2
35	**a)** Testosterone **b)** Ans. Sperms formation requires lower temperature than body temperature **c)** Easy transfer of sperm. Provides nutrients to the developing sperm. **d)** Male genital organ is also known as urinogenital organ. Because the passage of sperm and urine are same	1 1 1 2
	OR	
	(a)Different methods used to avoid pregnancy is called contraception. (b)Due to female foeticides, the child sex ratio is declining. (c)Mechanical barrier, Chemical ,Surgery ,IUCD (Any two) (d) Clinically abortion of foetus. Ultrasound	1 1 2 1
36	(i) The schematic diagram is given below  	2
	(ii) Here total voltage V = 5 x 2 = 10 V and total resistance $R = R_1 + R_2 + R_3$ $= 5 + 10 + 15$ $= 30\ \Omega$ ∴ Current passing through the circuit when the key is closed I=V/R =10/30 =0.33 A	2
	(iii) Potential difference across resistor R_3 of 15 Ω $V_3=IR_3=1/3x15=5V$	1

<table>
<tr><td></td><td>SECTION - E
Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 shortsub - parts. Internal choice is provided in one of these sub-parts.</td><td></td></tr>
<tr><td>37</td><td>a) Sulphuric acid
b) Bromine
c) green colour and Basic copper carbonate
OR
c) Na, K
Because they react vigorously with water that they catch fire if kept in the open.</td><td>1
1
2

1
1</td></tr>
<tr><td>38</td><td>(a) homozygous
(b) RR, Rr, rr (1:2:1) (Genotype)
3 Red and 1 White (Phenotype)
(c) Incomplete dominance and co-dominance
OR
(c) RR x rr F1 generation
Rr F2 generation
<table><tr><td></td><td>R</td><td>r</td></tr><tr><td>R</td><td>RR</td><td>Rr</td></tr><tr><td>r</td><td>rR</td><td>rr</td></tr></table></td><td>1
1

2</td></tr>
<tr><td>39</td><td>(a) Convex Mirror
(b) Placed near the focus.
(c) -80cm with calculation.
OR
(c) 2.4 with calculation.</td><td>1
1
2

2</td></tr>
</table>

ASSERTION REASON TYPE QUESTIONS

These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true and R is not the correct explanation of A

(c) A is true but R is false

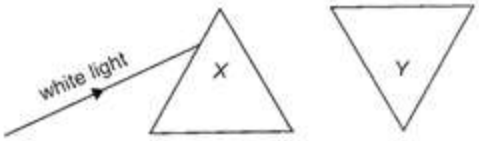
(d) A is False but R is true

1. **Assertion (A)** : When HCl is added to zinc granules, a chemical reaction occurs.
   Reason (R): Evolution of a gas and change in colour indicate that the chemical reaction is taking place.
2. **Assertion (A)**: A lead nitrate on thermal decomposition gives lead oxide, brown coloured nitrogen dioxide and oxygen gas.
   Reason (R): Lead nitrate reacts with potassium iodide to form yellow precipitate of lead iodide and the reaction is double displacement as well as precipitation reaction.
3. **Assertion: -** Bleaching powder used as oxidising agent in industries
   Reason:- Bleaching powder gives chlorine gas on coming in contact with air.
4. **Assertion: -** For preparation of carbon dioxide one cannot use marble and sulphuric acid.
   Reason: - Sulphuric acid do not produce carbon dioxide gas on reacting with metal carbonate.
5. **Assertion:** Zinc oxide is amphoteric in nature
   Reason: Zinc oxide reacts with both acids and bases.
6. **Assertion:** Anodizing is a method to prevent metal from corrosion.
   Reason: Anodizing is a process of coating iron with a layer of zinc.
7. **Assertion (A):** When conc. H_2SO_4 is added to ethanol, after heating Ethene is formed.
   Reason(R): Conc.H_2SO_4 acts as a dehydrating agent.
8. **Assertion (A):** The orange colour of bromine water disappears when it is added to propane.
   Reason(R): Unsaturated compounds can decolourise bromine water but saturated compounds do not.
9. **Assertion (A):** Pyruvate is a six carbon molecule.
   Reason (R): It is prepared in the cytoplasm as the first step of cellular respiration.
10. **Assertion (A):** Photosynthesis is opposite biochemical reaction of respiration.
    Reason (R): Energy is utilized during respiration.
11. **Assertion:** Abscisic acid is responsible for wilting of leaves.
    Reason: It is a growth inhibitor.
12. **Assertion:** A person has lost most of its intelligence memory and judgment.

    Reason: A person has operated a tumor located in the cerebrum.

13. **Assertion:** Testes in human males are located outside the abdominal cavity in scrotum.
    Reason: Testes secrete the male sex hormone testosterone
14. **Assertion:** In surgical method fallopian tube of female is blocked.
    Reason: Transfer of sperm into female genital tract is prevented as fallopian tube is blocked.
15. **Assertion (A):** The sex of the child in human beings is as per the type of chromosome inherited from the mother.
    Reason (R): The mother has only X chromosome in its gamete.
16. **Assertion (A):** Genes are the functional units of DNA molecule.

    Reason (R): A gene is responsible for coding the proteins to prepare the blueprint of body design.
17. **Assertion(A) :** In a rectangular glass slab the emergent ray is parallel to the direction of the incident ray.
    Reason (R) : The extent of bending of the ray of light at the opposite parallel faces (air- glass interface and glass-air interface) of the rectangular glass slab is equal and opposite.
18. **Assertion(A) :** A person cannot see his image in a concave mirror, unless, he is standing beyond the centre of curvature of the mirror.
    Reason (R): In a concave mirror, image formed is real provided the object is situated beyond its focus.
19. **Assertion (A):** A normal human eye can clearly see all the objects below and above 25 m.
    Reason (R): The human eye has the capacity to suitably adjust the focal length of its lens to a certain extent.
20. Two equilateral prisms are arranged as shown in diagram.



If white light incident on prism X then

Assertion (A): The ray of light which emerges out of the prism Y will be white light
Reason (R): The refraction produced by the prism Y is equal and opposite to that produced by prism X.

21. **Assertion (A):** When the resistances are connected between the same two points, they are said to be connected in parallel.
    Reason (R): In case the total resistance is to be increased, then theindividual resistances

    are connected in parallel.

22. **Assertion (A):** Bulb with less power will glow brighter when two bulbs are connected in series.
    Reason(R): Power dissipated by a bulb is independent of its resistance.
23. **Assertion (A):** The strength of the magnetic field produced at the centre of a

current carrying circular coil increases on increasing the current flowing through the coil.

Reason(R): Magnetic field strength is inversely proportional to the current flowing in the coil.

24. **Assertion (A):** Alternating Current is used in household supply.
    Reason(R): AC electric power can be transmitted over long distances without much loss of energy.
25. **Assertion:** Terrestrial food chain is the food chain present in water bodies.
    Reason: The example of aquatic food chain is
    phytoplankton$\rightarrow$ zooplankton $\rightarrow$ fish $\rightarrow$shark
26. **Assertion:** Garden is an artificial ecosystem.
    Reason: Biotic and abiotic components of garden can be manipulated by humans.
27. **Assertion: -** Loss of electron during a chemical reaction is termed asoxidation.
    Reason: - The substance that gains electron during a chemical reaction act as a reductant.
28. **Assertion:** Parental traits are asserted over generation independently.
    Reason: In gametes there can be one version of a particular trait, no two version representing a particular trait can inherited through the gametes

29. **Assertion:** Valves are there in veins to prevent back flow of blood.
    Reason: Vein walls are made up of smooth muscles.
30. **Assertion:** Force experienced by moving charge will be maximum if directionof velocity of charge is perpendicular to applied magnetic field.
    Reason: Force on moving charge is independent of direction of applied magnetic field.

ANSWERS OF ASSERTION REASON TYPE QUESTIONS

1. (b) Both A and R are true and R is not the correct explanation of A
2. (b) Both A and R are true and R is not the correct explanation of A
3. (a) Both A and R are true and R is the correct explanation of A
4. (c) A is true but R is false.
5. (a) Both A and R are true and R is the correct explanation of A
6. (c) Assertion is true, but Reason is false.
7. (a) Both A and R are true and R is the correct explanation of A
8. (d) A is false but R is true
9. (d) Assertion is false but reason is true.
10. (c) Assertion is true but reason is false.
11. (a) Both A and R are true and R is the correct explanation of A
12. (a) Both A and R are true and R is the correct explanation of A
13. (b) Both A and R are true and R is not the correct explanation of A
14. (c) A is true but R is false
15. (d) Assertion is false but reason is true.
16. (a) Both A and R are true and R is the correct explanation of A
17. (a) Both A and R are true and R is the correct explanation of A
18. (d) A is false but R is true
19. (d) (A) is False but (R) is true.
20. (a) Both A and R are true and R is the correct explanation of A
21. (c) A is true but R is false
22. (c) A is true but R is false
23. (c) A is true but R is false
24. (a) Both A and R are true and R is the correct explanation of A.
25. (d) Assertion is false and reason is true.
26. (a) Both A and R are true and R is the correct explanation of A.
27. (c) A is true but R is false
28. (a) Both A and R are true and R is the correct explanation of A
29. (b) Both A and R are true and R is not the correct explanation of A
30. (c) A is true but R is false

CASE BASED QUESTIONS

Following are some case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

1. Corrosion is the phenomenon of deterioration of surface of metal in presence of air and moisture. It is a natural process and in the presence of a moist atmosphere, chemically active metals get corroded. This is an oxidation reaction. Rusting is the process where iron corrodes due to exposure to the atmosphere. The corrosion occurs mainly with iron because it is used as structural material in construction, bridges, buildings, rail transport, ships, etc. Aluminum is also an important structural metal, but even aluminium undergoes oxidation reactions. Food materials containing fats and oils when left for a long time get rancid. Rancidity is also an oxidation reaction.
   (a) What happens to the food after rancidity?
   (b) What are the colour changes we observed in copper and silver after corrosion?
   (c) What are the methods of prevention of rancidity? (Any two)

   OR

   (c) What are anti- oxidants? Why are they added to fat and oil containing foods?

2. An acid tanker truck while going on the road faces accident, the tank burst acid spills over the metallic drain cover along road side, fessing occurs people observe dead body of aquatic organism floating on the river nearby and report to water resources department technician came after conducting a test concluded the reason and suggested the remedy on the basis of above fact answer the following questions.
   (a) Predict the reason for fessing occurs on acid spills over the drain cover.
   (b) Suggest the test conducted by technician and his conclusion for death of aquatic life form
   (c) Specify the remedy must be suggested by technician to restore the quality of water. State the reason for your answer.

   OR

   (c) If a crop field located nearby instead of river will the crop plant affected explain with reason.

3. Metals as we know, are very useful in all fields, industries. Non-metals are no less in any way. Oxygen present in air is essential for breathing as well as for combustion. Non- metals form a large number of compounds which are extremely useful, e.g , ammonia, nitric acid, sulphuric acid etc. Non- metals are found to exist in three states of matter. Only solid non-metals are expected to be hard however, they have low density and are brittle. They usually have low melting and boiling points and are poor conductors of electricity.
   (a) Name the acid which is known as ‘king of chemicals’.
   (b) Name a non-metal which is liquid at room temperature.
   (c) If copper is kept exposed to damp air, it develops a green coating on its surface. Write the change in colour and chemical name of coating.

OR

(c)Which metals kept in kerosene and why?

4. The compounds which have the same molecular formula but different structures are called isomers and the phenomenon is called isomerism. When the isomerism is due to difference in the arrangement of atoms within the molecule, without any reference to space, the phenomenon is called structural isomerism. In other words. Structural isomers are compounds that have the same molecular formula but different structural formulas, i.e., they are different in the order in which different atoms are linked. In these compounds, carbon atoms can be linked together in the form of straight chains, branched chains or even rings.

(a) Write the IUPAC name of different chain isomers of 4th member of alkane.

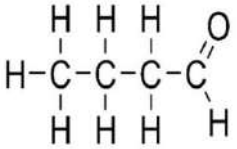
(b) **A** and **B** are two organic compounds having molecular formula **C_4H_8.** Compound **A** is in chain form and compound **B** is in ring structure. Draw the structure of A and B.

(c) Propanone and Propanal: are they isomers? Justify your answer.

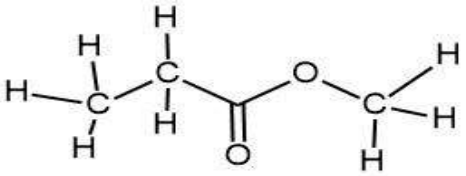
OR

(c)

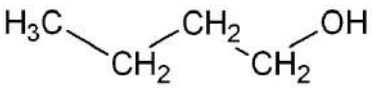
(a)



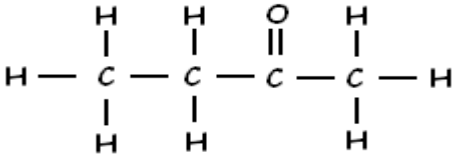
(b)



(c)



(d)



Identify the isomeric pair. Give reason for your selection.

5. Some experiments were carried out using variegated leaves bearing plants to understand the process of photosynthesis. It was observed that the leaves of the plant exposed to light for longer duration accumulated more starch. However due to presence of pre-formed starch in the leaves, it was difficult to find the net productivity on a fixed exposure to light source. Therefore, it was necessary to obtain starch free leaves in the plant before starting the experiment.

(a) How will you obtain starch free leaves in the plants?

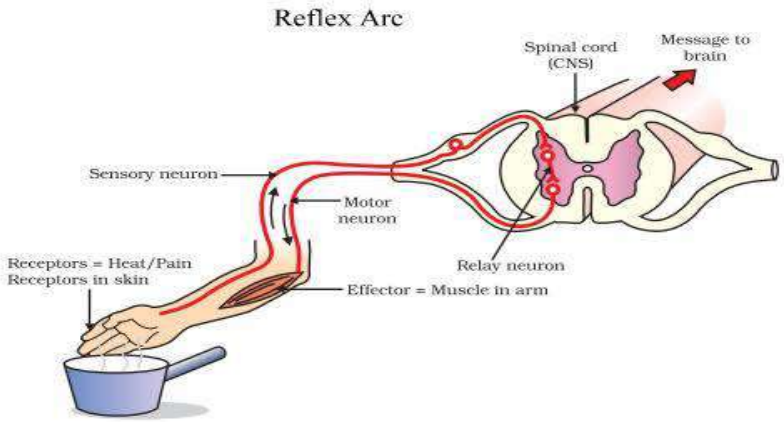
(b) After a period of illumination the leaves were boiled in alcohol to make them colourless. Which test can be performed to test the end product stored in the leaves?

(c) If some of the leaves were coated with wax on both the surfaces. Mention the two processes that can be stopped which leads to wilting.

OR

(c) During the morning hours using a fine blade an incision was made to the leaves such that the phloem tissue was cut open. Analyse the liquid that comes out and mention the name of the cell of phloem which transport that liquid.

6.



When we touch a hot plate unknowingly, then this heat is sensed by a P present in our fingers. The receptor triggers an impulse in neuron Q which transmits the message to an organ R which is a part of the CNS. Here the impulse is passed on to a neuron S which in turn passes to a yet another neuron T. The neuron T passes the impulse to a tissue U in our arm. The tissue U then contracts and pulls our hand away from the hot plate. Look at the image above and answer the following questions:

(a) State the name of the receptor P and organ R.

(b) Mention the neurons involved in this process.

(c) Mention the pathway of reflex arc.

OR

(c) List two advantages of the above phenomena.

7. Read the following paragraph carefully and answer the questions given below:

Pre-conception and pre-natal Diagnostic Techniques Act1994 is an Act of the parliament of India enacted to stop female foeticides and arrest the declining sex ratio in India. The act banned prenatal sex determination. This process began in the early 1990 when ultrasound techniques gained widespread use in India. There was a tendency for families to continuously produce children until a male child was born. Social discrimination against women and a preference for sons have promoted female foeticide in various forms skewing the sex ratio of the country towards men.

(a)What is contraception?

(b)Why is child sex- ratio declining at an alarming rate in India?

(c) Write the names of any two contraceptive methods.

OR

(c) How can unwanted pregnancies be terminated? Name the technique used for pre-natal sex determination.

8. In a monohybrid cross between a plant having red flower is crossed with a plant having a white flower. Both the parents are pure varieties. Each organism has two alleles received one from each parent. The allele which displays its effect is called a dominant trait and which cannot express is called a recessive trait. Sometimes, neither of the allele is completely dominant over the opposite. As a result a different phenotype is formed. In some other cases, both the alleles cannot block the expression of each other. For example – some pink colour flower and some white spotted red coloured flower bearing plants appear in F_2 generation.

(a) In pure varieties, the alleles are similar. What is it called as?

(b) When 'RR' crossed with 'rr' it gave rise to 'Rr' in F_1 generation. As per law of dominance, what will be the phenotypic and genotypic in F_2 generation?

(c) In the above diagram, the two different colored flowers are shown in F_1 generation. Name the two phenomena they display.

OR

(c) Based on the above example in the paragraph, draw a Punnett Square showing the F_1 and F_2 generations.

9. A student of class X placed the object in front of a convex lens at different distance from it and recorded the image distance as per the given data in the following table.

SL NO.	Object distance 'U' in cm	Image distance 'V' in cm
1	-60	+12
2	-30	+15
3	-20	+20
4	-15	+30
5	-12	+60
6	-9	+90

Read the above paragraph and answer the following questions

(a) Find the focal length of the convex lens.

(b) At which of the position of the object from the lens, image formed by the above convex lens will be real, inverted and magnified.

(c) Can a convex lens can be used as a magnifying glass? State the reason

OR

(c) Draw the ray diagram for the formation of virtual image by the convex lens.

10. Akshay, sitting in the last row in his class, could not see clearly the words written on the blackboard. When the teacher noticed it, he announced if any student sitting in the front row could volunteer to exchange his seat with Akshay. Salman immediately agreed to exchange his seat with Akshay. He could now see the words written on the blackboard clearly. The teacher thought it fit to send the message to Akshay's parents advising them to get his eyesight checked. In the context of the above event, answer the following questions:

(a) Which defect of vision is Akshay suffering from?

(b) Which type of lens is used to correct this defect?

(c) Draw the ray diagram to show the above defective eye and its correction.

OR

(c) The far point of the above defective eye is 100 cm in front of the eye. Find the power of the lens required to correct the above problem.

11. The following table given below shows the resistivity of threematerials X, Y and Z. Analyze the table and answer the following questions:

Samples	**X**	**Y**	**Z**
Resistivity	**$2.63 X10^{-8}$**	**$44 X 10^{-6}$**	**$1.8 X10^{17}$**

(a) Arrange the samples in increasing order of their conductivity.

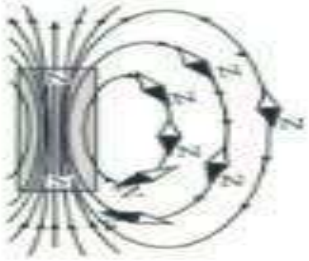
(b) Which of the materials can be used as a resistor and as an insulator?

(c) Two wires, one of material X and other of Y, have equal lengths and equalresistance. Which wire is thicker and why?

OR

(c) Two wires, one of material X and other of Y, have equal lengths and equal area of cross section. Which wire draws more current at same potential difference and why?

12. A magnetic field is described by drawing the magnetic field lines. The path traced by a north magnetic pole free to move under the influence of a magnetic field is called a magnetic field line. Since the direction of magnetic field line is the direction of force on a north pole, so the magnetic field lines always begin from the N-pole of a magnet and end on the S-pole of the magnet. Inside the magnet, however the direction of magnetic field lines is from the S-pole of the magnet to the N-pole of the magnet. Thus, the magnetic field lines are closed curves. When a small compass is moved along a magnetic field line, the compass needle always sets itself along the line tangential to it. So, a line drawn from the south pole of the compass needle to its north pole indicates the direction of the magnetic field at that point.



(a) A magnetic needle is deflected when it is brought near a current carrying conductor, why?

(b) Draw the diagram of uniform magnetic field in a given region.

(c) List any two properties of magnetic field lines.

OR

(c) Name and state the rule to find out the direction of magnetic field around a straight conductor carrying current.

13. Food chains are very important for survival of most species. When only one element is removed from the food chain it can result in extinction of a species in some cases. The foundation of the food chain consists of primary producers. Primary producers or autotrophs, can use either solar energy or chemical energy to create complex organic compounds, whereas species at higher trophic levels cannot and so must consumes producers or other life that itself consumes producers. Because the sun's light is necessary for photosynthesis, most life could not exist if the sun disappeared. Even so, it has recently been discovered that there are some forms of life, chemotrophs, that appear to gain all their metabolic energy from chemosynthesis driven by hydrothermal vents, thus showing that some life may not require solar energy to thrive.

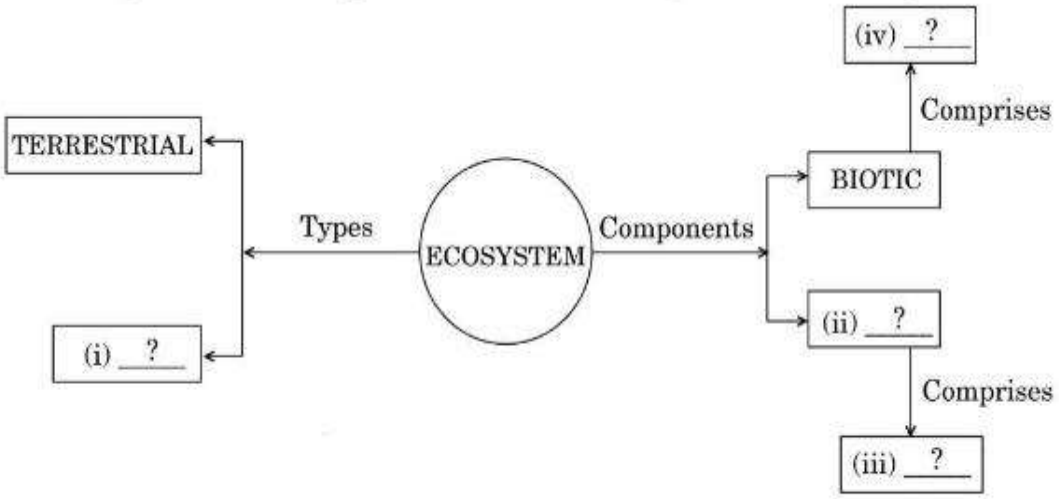
(a) If 10000 J solar energy falls on green plants in a terrestrial ecosystem, how much will be available to the green plants?

(b) Aquarium needs regular cleaning. Justify.

(c) State with reason the consequences of decrease in the number of carnivores in a food chain.

OR

(c) Complete the following flow chart based on ecosystem and its components.



MARKING SCHEME OF CASE BASED QUESTIONS

1. (a) It makes the food foul smelling and bad in taste that is not good for health.
   (b) After corrosion we observed green coating on copper and black coating on silver.
   (c) Methods of prevention of rancidity are-
   (i) Use of anti – oxidants
   (ii) Packaging of food in the bags flushed with nitrogen gas.
   (iii) Storing the food materials in air tight containers. (any two)

OR

(c) Anti- oxidants are the substances that are added to food to prevent oxidation of oils and fats present in the food items.

2. (a) Acid react with metal to release hydrogen gas that leads to fessing.
   (b) Test the pH of river water using a pH paper and found that pH of river water decreases below 5.6 which is unsuitable for survival of aquatic life.
   (c) Remedy suggested by technician shall be adding lime to the water being basic in nature it neutralises the river water and restore its pH value between 7-7.8 suitable for aquatic life.

OR

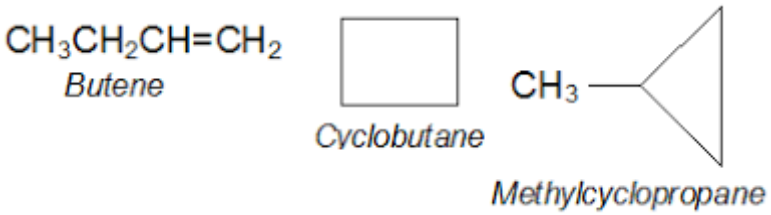
(c) Plants are also pH sensitive if the soil become acidic pH go down that will affect the crop plant as they also need a pH range of 7-7.8 for their survival.

3. (a) Sulphuric acid
   (b) Bromine
   (c) Green colour and Basic copper carbonate

OR

(c) Na, K
Because they react vigorously with water that they catch fire if kept in the open.

4. (a) Butane & 2- Methyl propane
   (b)



(Any one from cyclobutene or methyl cyclopropane)

(c)Yes
As both have same molecular formula C_3H_6O but different structures.

OR

(c) 1 and 4

As both have same molecular formula ie C_4H_8O but different structures.

5. (a) the starch free leaves can be obtained by keeping the plant in dark so that already present starch is utilized in 48 hours.

(b) Iodine solution test.

(c) Photosynthesis, respiration and transpiration. (Any two)

OR

(c) Sucrose and Sieve tube of Phloem.

6. (a) P- Thermo receptor, R – Spinal cord

(b) Sensory and Motor neuron

(c)Receptor organ----→ Sensory neuron---→ Spinal cord--→Motor neuron----→ Effector organ

OR

(c) Increases the survival value

Checks overtaxing of brain

7. (a) Different methods used to avoid pregnancy is called contraception.

(b) Due to female foeticides, the child sex ratio is declining.

(c) Mechanical barrier, Chemical, Surgery, IUCD (Any two)

OR

(c) Clinically abortion of foetus. Ultrasound

8. (a) homozygous

(b) RR, Rr, rr (1:2:1) (Genotype)

3 Red and 1 White (Phenotype)

(c) Incomplete dominance and co-dominance

OR

(c) RR x rr → F_1 generation

Rr

F_2 generation

	R	r
R	RR	Rr
r	rR	rr

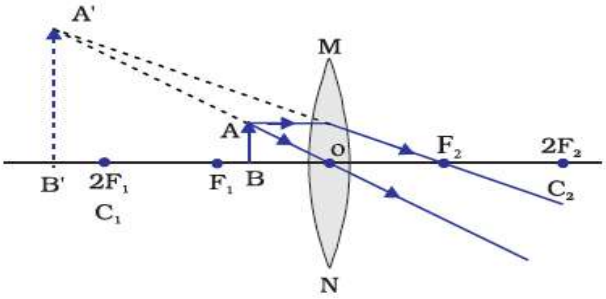
9. (a) f = 10cm

(b) position =15cm

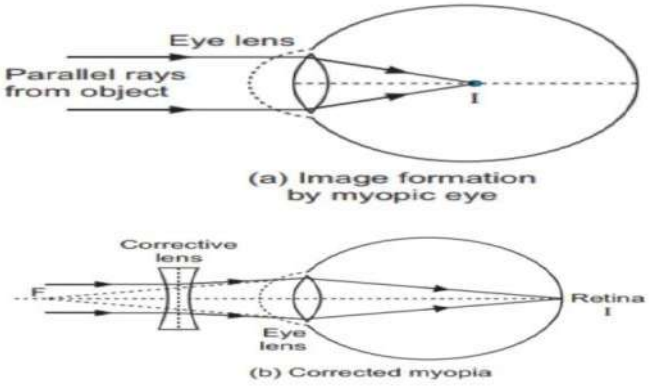
(c) yes , When object is placed between the focus and optical centre the image will virtual and magnified.

OR

(c)



10. (a) Akshay suffering from is myopia.
(b) Concave lens of suitable focal length is used to correct this defect.
(c)



OR

(c) U=∞ v=-100cm

$\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$

$\frac{1}{-100}-\frac{1}{\infty}=\frac{1}{f}$

f =-100cm

p =(100/100) = -1 D

11. (a) Z < Y< X
(b)Y as the resistor and Z as the insulator.
(c)Wire of material Y is thicker. As it has more resistivity having same resistance to X and Rα1/A.

OR

(c) Wire of material X draws more current.
As it has less resistance due to less resistivity.

12. (a) Because a current carrying conductor behaves as a magnet.
(b) correct diagram
(c) Any two properties

OR

(c) Right hand thumb rule Correct statement

13. (a) 100 J

(b) As decomposers are absent in aquarium so it needs regular cleaning.

(c) The consequences of decrease in the number of carnivores in a food chain will increase the number of herbivores which reduces the producer's number that affects the ecological balance.

OR

(c) (i) aquatic (ii) abiotic (iii) soil (iv) plants