

5. An electrolytic cell consists of : 1
- | | |
|--------------------------------|---------------------------------|
| (i) positively charged cathode | (ii) negatively charged anode |
| (iii) positively charged anode | (iv) negatively charged cathode |
| (a) (i) and (ii) | (b) (iii) and (iv) |
| (c) (i) and (iii) | (d) (ii) and (iv) |

6. The soap molecule has a : 1
- (a) hydrophilic head and a hydrophobic tail.
 (b) hydrophobic head and a hydrophilic tail.
 (c) hydrophobic head and a hydrophobic tail.
 (d) hydrophilic head and a hydrophilic tail.

OR

Arrange the following elements in the order of their decreasing metallic character :

Na, Si, Cl, Mg, Al. 1

- | | |
|------------------------------|------------------------------|
| (a) $Cl > Si > Al > Mg > Na$ | (b) $Na > Mg > Al > Si > Cl$ |
| (c) $Na > Al > Mg > Cl > Si$ | (d) $Al > Na > Si > Ca > Mg$ |

7. Which of the following events takes place after double fertilization ? 1
- (a) Pollen grain germinates on the stigma.
 (b) Pollen tubes enter the embryo sac.
 (c) Two male gametes are discharged into the embryo sac.
 (d) The ovary develops into fruit.

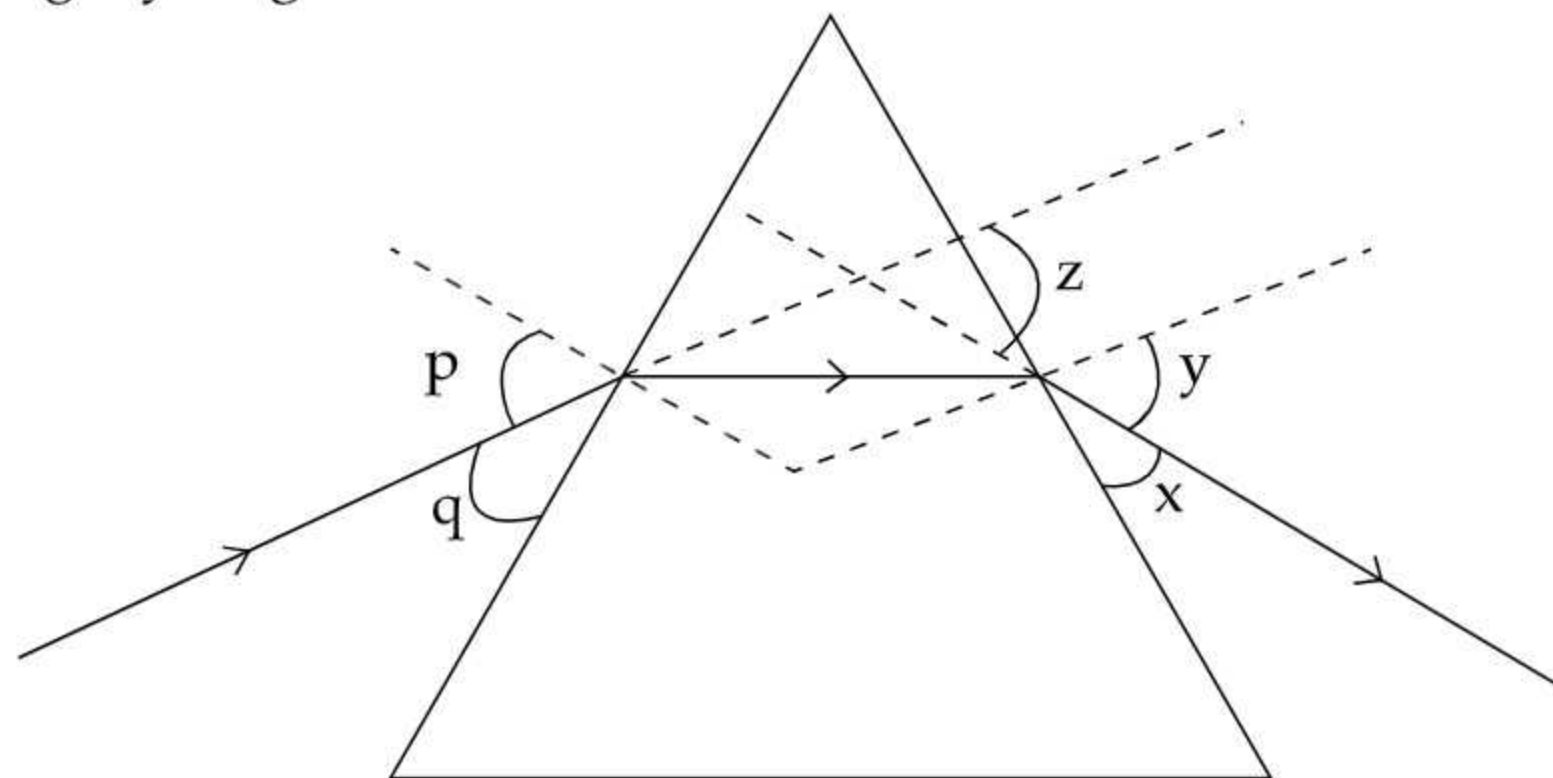
8. Select the correct statement. 1
- (a) Tendril of a pea plant and phylloclade of *Opuntia* are homologous.
 (b) Tendril of a pea plant and phylloclade of *Opuntia* are analogous.
 (c) Wings of birds and limbs of lizards are analogous.
 (d) Wings of birds and wings of bat are homologous.

9. A student very cautiously traces the path of a ray through a glass slab for different values of the angle of incidence ($\angle i$). He then measures the corresponding values of the angle of refraction ($\angle r$) and the angle of emergence ($\angle e$) for every value of the angle of incidence. On analyzing these measurements of angles, his conclusion would be. 1

- | | |
|--------------------------------------|--------------------------------------|
| (a) $\angle i > \angle r > \angle e$ | (b) $\angle i = \angle e > \angle r$ |
| (c) $\angle i < \angle r < \angle e$ | (d) $\angle i = \angle e < \angle r$ |

10. A child is standing in front of a magic mirror. She finds the image of her head bigger, the middle portion of her body of the same size and that of the legs smaller. The following is the order of combinations for the magic mirror from the top. 1
- | | |
|-------------------------------|-------------------------------|
| (a) Plane, convex and concave | (b) Convex, concave and plane |
| (c) Concave, plane and convex | (d) Convex, plane and concave |

11. Study the following ray diagram : 1



In this diagram, the angle of incidence, the angle of emergence and the angle of deviation respectively have been represented by 1

- | | |
|--------------------|--------------------|
| (a) y, p and z | (b) x, q and z |
| (c) p, y and z | (d) p, z and y |

12. At the time of short circuit, the current in the circuit : 1
- (a) reduces substantially. (b) does not change.
 (c) increases heavily. (d) vary continuously.

For question numbers 13 and 14, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below :

- (i) Both A and R are true and R is correct explanation of the assertion.
 (ii) Both A and R are true but R is not the correct explanation of the assertion.
 (iii) A is true but R is false.
 (iv) A is false but R is true.
13. **Assertion (A)** : Muscles of stomach wall possess thick layers of muscles. 1
Reason (R) : These muscles help in mixing the food with the enzymes present in the alimentary canal.
OR
Assertion (A) : In humans, males play an important role in determining the sex of the child.
Reason (R) : Males have two X chromosomes.
14. **Assertion (A)** : Light from a distant object arriving at the eye lens may get converged at a point in front of the retina. 1
Reason (R) : The eye is producing too much divergence in the incident beam.

SECTION B

- [AI]** 15. In the reaction : 3
- $$\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$$
- (a) Name the compound (i) oxidised, (ii) reduced.
 (b) Define oxidation and reduction on its basis.
OR
 Explain the action of dilute hydrochloric acid on the following with chemical equation :
 (i) Magnesium ribbon (ii) Sodium hydroxide
 (iii) Crushed egg shells
16. Distinguish between esterification and saponification reactions with the help of the chemical equations for each. State one use of each (i) esters, and (ii) saponification process. 3
- [AI]** 17. An element 'M' has atomic number 12. 3
- (i) Write its electronic configuration and valency.
 (ii) Is 'M' a metal or a non-metal ? Give reason in support of your answer.
 (iii) Write the formula and nature (acidic, basic) of the oxide of M. 3
18. List two types of the transport system in human beings and write the functions of any one of these. 3
19. Distinguish between pollination and fertilization. Mention the site and the product of fertilization in a flower. 3
- OR**
- [AI]** (a) Budding, fragmentation and regeneration, all are considered as asexual mode of reproduction. Why ?
 (b) With the help of neat diagrams, explain the process of regeneration in *Planaria*.
20. Define angle of deviation. Why do different components of white light split up into spectrum when it passes through a triangular glass prism ? Show the angle of deviation for red colour when white light passes through a prism. 3
- [AI]** 21. What is electrical resistivity ? Derive its SI unit. In a series electrical circuit comprising a resistor made up of a metallic wire, the ammeter reads 100 mA. If the length of the wire is doubled, how will the current in the circuit change ? Justify your answer. 3
22. Can a freely suspended current carrying solenoid stay in any direction ? Justify your answer. What will happen when the direction of current in the solenoid is reversed ? Explain. 3
23. Explain the term 'geothermal energy'. How can it be exploited ? Though it is economical yet it is not harnessed in most of the countries. Why ? 3
- OR**
 List three advantages of harnessing wind energy.

SECTION C

25. Account for the following : 5
- (i) State the relation between hydrogen ion concentration of an aqueous solution and its pH.
 - (ii) An aqueous solution has a pH value of 7.0. Is this solution acidic, basic or neutral ?
 - (iii) Which has a higher pH value, 1 M HCl or 1 M NaOH solution ?
 - (iv) Tooth enamel is one of the hardest substances in our body. How does it undergo damage due to eating chocolates and sweets ? What should we do to prevent it ?
 - (v) How do $[H^+]$ ions exist in water ?

OR

- (a) List in tabular form any three chemical properties on the basis of which metals and non-metals are differentiated.
 - (b) State two ways to prevent the rusting of iron.
26. Give two examples of covalent compounds which you have studied. State any four properties in which covalent compounds differ from ionic compounds. 5
27. (a) Write the reaction that occurs when glucose breaks down anaerobically in yeast.
- (b) Write the mechanism by which fishes breathe in water.
 - (c) Name the balloon like structures present in lungs. List its two functions.
 - (d) Name the respiratory pigment and write its role in human beings. 5

OR

- (a) Draw a diagram of cross-section of the human heart and label the following parts :
 - (i) Right ventricle
 - (ii) Aorta
 - (iii) Left atrium
 - (iv) Pulmonary arteries.
 - (b) Give reasons for the following :
 - (i) The muscular walls of ventricles are thicker than the walls of atria.
 - (ii) Arteries have thick elastic walls.
28. (a) Why did Mendel choose garden pea for his experiments ? Write two reasons.
- (b) List two contrasting visible characters of garden pea Mendel used for his experiment.
 - (c) Explain in brief how Mendel interpreted his results to show that the traits may be dominant or recessive. 5
29. (a) If the image formed by a mirror for all positions of the object placed in front of it is always diminished, erect and virtual; state the type of the mirror and also draw a ray diagram to justify your answer. Write one use such mirrors are put to and why.
- (b) Define the radius of curvature of spherical mirrors. Find the nature and focal length of a spherical mirror whose radius of curvature is + 24 cm. 5

OR

It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm.

- (i) What should be the range of distance of an object placed in front of the mirror ?
- (ii) Will the image be smaller or larger than the object ? Draw ray diagram to show the formation of image in this case.
- (iii) Where will the image of this object be, if it is placed 24 cm in front of the mirror ? Draw ray diagram for this situation to justify your answer.

Show the positions of pole, principal focus and the centre of curvature in the above ray diagrams.

30. (i) State Fleming's left hand rule.
- (ii) Write the principle of working of an electric motor.
 - (iii) Explain the function of the following parts of an electric motor.
 - (a) Armature
 - (b) Brushes
 - (c) Split ring 5