

Instructions: (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(2) Use Black or Blue ink to write and underline and pencil to draw diagrams.

Note: This question paper contains four parts.

PART - I

Note : (i) Answer all the questions.

(ii) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer. 12x1=12

1. In which of the following sport the turning of effect of force used
a) swimming b) tennis c) cycling d) hockey
2. The value of universal gas constant
a) $3.81 \text{ Jmol}^{-1}\text{k}^{-1}$ b) $8.03 \text{ Jmol}^{-1}\text{k}^{-1}$ c) $1.38 \text{ Jmol}^{-1}\text{k}^{-1}$ d) $8.31 \text{ Jmol}^{-1}\text{k}^{-1}$
3. Artificial radioactivity was discovered by
a) Becquerel b) Irene Curie c) Roentgen d) Neils Bohr
4. The volume occupied by 4.4g of CO_2 at S.T.P.
a) 22.4 litre b) 2.24 litre c) 0.24 litre d) 0.1 litre
5. Powdered CaCO_3 reacts more rapidly than flaky CaCO_3 because of
a) large surface area b) high pressure
c) high concentration d) high temperature
6. TFM in soaps represents content in soap.
a) mineral b) vitamin c) fatty acid d) carbohydrate
7. Colourless plastids are called as
a) Chloroplast b) Chromoplast c) Leucoplast d) Chlorophyll
8. Which is the following process requires energy?
a) active transport b) diffusion c) osmosis d) all of them
9. To increase the sugar production in sugarcanes they are sprayed with
a) Auxin b) Cytokinin c) Gibberellins d) Ethylene
10. The brain of leech lies above the
a) mouth b) buccal cavity c) pharynx d) crop
11. Vomiting centre is located in
a) medulla oblongata b) stomach
c) cerebrum d) hypothalamus
12. Biogenesis was speculated by that life originates from pre-existing life.
a) Oparin b) Haldane c) Louis Pasteur d) Charles Darwin

PART - II

Answer any seven questions. Question No. 22 is compulsory.

7x2=14

13. How does an astronaut float in a space shuttle?
14. Why is tungsten metal used in bulbs, but not in fuse wires?
15. Define - Atomicity.
16. Define - volume percentage

17. Name the three basic tissues system in flowering plants.
18. Define Idiogram and Mutation.
19. Write the dental formula of rabbit.
20. Why is Archaeopteryx considered to be a connecting link?
21. What is metastasis?
22. An electric heater of resistance 5Ω is connected to an electric source. If a current of 6A flows through the heater, then find the amount of heat produced in 5 minutes.

PART - III

Answer any seven questions. Question No. 32 is compulsory.

7x4=28

23. Write the concepts about force, motion and inertia of bodies proposed by Galileo.
24. Differentiate convex lens and concave lens.
25. Air temperature in the Rajasthan desert can reach 46°C . What is the velocity of sound in air at that temperature? ($V_0 = 331\text{ms}^{-1}$).
26. Derive the relationship between relative molecular mass and vapour density.
27. State two conditions necessary for rusting of iron.
28. Differentiate reversible and irreversible reactions.
29. Draw and label the structure of mitochondria.
30. State the application of DNA finger printing technique.
31. Differentiate between voluntary and involuntary actions.
32. i) A solution is prepared by dissolving 45g of sugar in 180g of water. Calculate the mass percentage of solute.
ii) The hydroxide ion concentration of a solution is 1.0×10^{-11} M. What is the pH of the solution?

PART - IV

Note: i) Answer all the questions.

3x7=21

ii) Each question carries seven marks.

iii) Draw diagram wherever necessary.

33. a) i. State the universal law of gravitation and derive its mathematical expression.
ii. Derive the ideal gas equation.
(OR)
- b) i. List the merits of LED bulb.
ii. Explain the process of controlled and uncontrolled chain reaction.
34. a) i. Give the salient features of modern atomic theory.
ii. Explain the types of double displacement reaction with examples.
(OR)
- b) i. How many grams are there in the following:
 - 1) 2 moles of hydrogen molecule, H_2 .
 - 2) 3 moles of chlorine molecule, Cl_2 .
 - 3) 5 moles of sulphur molecule, S_8 .
- ii) a) What is a chemical equilibrium? What are its characteristics of chemical equilibrium?
b) Give the balanced chemical equation of the following reactions.
 1. Neutralization of NaOH with ethanoic acid.
 2. Evolution of carbon dioxide by the action of ethanoic acid with NaHCO_3 .
35. a) i. How do plant absorb water? Explain.
ii. Write the physiological effects of gibberellins.
(OR)
- b) i. What will you do if someone pricks your hand with a needle? Elucidate the pathway of response with a neat labelled diagram.
ii. Natural selection is a driving force for evolution. How?