CBSE EXAMINATION PAPER-2024

SCIENCE

(Solved)

Time allowed : 3 hours | Maximum Marks : 45

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **28 questions.** All questions are **compulsory.**

ii. This question paper is divided into **4 sections.**

iii. **Section A** – questions number **1 to 11** are multiple choice questions Each question carries **1 marks.**

iv. **Section B** – questions number **12 to 19** are very short answer Each question carries **2 marks.**

v. **Section C** – questions number **20 to 25** are short answer Each question carries **3 marks.**

vi. **Section D** – questions number **26 to 28** are case based questions

vii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

viii. Use of calculator is NOT allowed.

Section A

Question 1. Solid Calcium oxide reacts vigorously with water to form Calcium hydroxide accompanied by the liberation of heat. From the information given above it may be concluded that this reaction is:

[1 Marks]

(A) is endothermic and pH of the solution formed is more than 7.

(B) is exothermic and pH of the solution formed is 7.

(C) is endothermic and pH of the solution formed is 7.

(D) is exothermic and pH of the solution formed is more than 7.

Question 2. Juice of tamarind turns blue litmus to red. It is because of the presence of an acid called:

[1 Marks]

(A) methanoic acid

(B) acetic acid

(C) tartaric acid

(D) oxalic acid

Question 3.

Select from the following a process in which a combination reaction is involved:

[1 Marks]

(A) Black and White photography

(B) Burning of methane

(C) Burning of coal

(D) Digestion of food

Question 4.

Identify the correct statement about the following reaction

$2H_2S + SO_2 \rightarrow 2H_2O + S$:

[1 Marks]

(A) SO_2 is oxidized to sulfur.

(B) H_2S is reduced to sulfur.

(C) SO_2 is the oxidizing agent and H_2 is the reducing agent.

(D) H_2S is the oxidizing agent and $O_2$is the reducing agent.

Question 5.

Consider the following statements about homologous series of carbon compounds:

All succeeding members differ by a CH_2 unit.

Melting point and boiling point increase with increasing molecular weight.

The difference in molecular masses between two successive members is 16u.

C_2H_2 and C_3H_4 are NOT the successive members of alkene series.

[1 Marks]

(A) (a) and (b)

(B) (a) and (c)

(C) (c) and (d)

(D) (b) and (c)

Question 6. Select out of the following a gland which does NOT occur as a pair in the human body:

[1 Marks]

(A) Pituitary

(B) Ovary

(C) Testis

(D) Adrenal

Question 7. In the human respiratory system, when a person breathes in, the position of ribs and diaphragm will be:

[1 Marks]

(A) lifted ribs and curve/dome shaped diaphragm.

(B) lifted ribs and flattened diaphragm.

(C) relaxed ribs and flattened diaphragm.

(D) relaxed ribs and curved dome shaped diaphragm.

Question 8.

Identify the mode of asexual reproduction in the following organism:

[1 Marks]

(A) Budding

(B) Binary fission

(C) Multiple fission

(D) Fragmentation

Question 9.

The maximum resistance of a network of five identical resistors of 1/5 Ω each can be:-

[1 Marks]

(A) 0.5Ω

(B) 0.25 Ω

(C) 0.1 Ω

(D) 1Ω

Question 10.

Study the I-V graph for three resistors of resistances R_1, R_2, and R_3 and select the correct statement from the following:

[1 Marks]

(A) $R_2 > R_3 > R_1$

(B) $R_3 > R_2 > R_1$

(C) $R_1 = R_2 > R_3$

(D) $R_1 = R_2 = R_3$

Question 11. Strength of magnetic field produced by a current carrying solenoid does NOT depend upon:

[1 Marks]

(A) number of turns in the solenoid

(B) radius of solenoid

(C) direction of the current flowing through it

(D) material of the core of the solenoid

Section B

Question 12. "No precipitation reaction can occur without exchange of ions between the two reactants." Justify this statement giving a balanced chemical equation for the reaction.

[2 Marks]

Question 13. Giving one example of each, differentiate between a displacement reaction and a double displacement reaction.

[2 Marks]

Question 14. Photosynthesis takes place in the leaves and the food prepared by it reaches other parts of the plants. Name the process involved and explain it.

[2 Marks]

Question 15. "Stability of DNA in a species is ensured during sexual reproduction." Justify the statement.

[2 Marks]

Question 16. State two laws of refraction of light.

[2 Marks]

Question 17.

Define the term absolute refractive index of a medium. A ray of light enters from vacuum to glass of absolute refractive index 1.5. Find the speed of light in glass. The speed of light in vacuum is 3×10^8 m/s.

[2 Marks]

Question 18. Use Ohm's law to determine the potential difference across the 3 Ω resistor in the circuit shown in the following diagram when key is closed.

[2 Marks]

Question 19. Name the term used for the materials which cannot be broken down by biological processes. Give two ways by which they harm various components of an ecosystem.

[2 Marks]

Section C

Question 20. It is observed that Calcium on reaction with water floats on its surface. Explain why it happens. Also write a balanced chemical equation for the reaction that occurs. What happens when the aqueous solution of the product of this reaction reacts with Carbon dioxide gas? Write a balanced chemical equation for the reaction.

[3 Marks]

Question 21. Draw a labelled diagram to show electrolytic refining of copper. State what happens when electric current is passed through the electrolyte taken in this case.

[3 Marks]

Question 22. Explain the events that take place once a sperm reaches the oviduct till it becomes a foetus. Write the role of placenta in pregnancy.

[3 Marks]

Question 23.

(1) Define the term power of accommodation of the human eye. Write the name of the part of the eye which plays a major role in the process of accommodation and explain what happens when the human eye focuses (i) on nearby objects and (ii) distant objects.

[3 Marks]

Question 24. Use of pesticides to protect our crops affect organisms at various trophic levels especially human beings. Name the phenomenon involved and explain how this happens.

[3 Marks]

Question 25.

Draw a ray diagram to show the formation of a rainbow in the sky. On this diagram, mark A – where dispersion of light occurs, B – where internal reflection of light occurs and C – where refraction of light occurs. List two necessary conditions to observe a rainbow.

[3 Marks]

Section D

Question 26. Salts play a very important role in our daily life. Sodium chloride which is known as common salt is used almost in every kitchen. Baking soda is also a salt used in faster cooking as well as in baking industry. The family of salts is classified on the basis of cations and anions present in them.

(1) Find the cation and the anion present in Calcium sulphate.

[1 Marks]

(2) Identify the acid and base from which Sodium chloride is formed.

[1 Marks]

(3) Sodium chloride and washing soda both belong to the same family of salts. Justify this statement.

[2 Marks]

(4)

Define the term pH scale. Name the salt obtained by the reaction of Potassium hydroxide and Sulphuric acid and give the pH value of its aqueous solution.

[2 Marks]

Question 27. Asexual reproduction involves a single parent to produce offsprings without the formation of gametes. It occurs by the following ways: Fission, Budding, Fragmentation, Spore formation and Regeneration. In one of the methods like regeneration, Planaria A is cut horizontally into three pieces — L, M and N and Planaria B is cut vertically into two equal halves — O and P.

(1) Which of the cut pieces of the two Planaria could regenerate to form a complete organism?

[1 Marks]

(2) Give an example of another organism which follows the same mode of reproduction as Planaria.

[1 Marks]

(3) What is the meaning of 'development' in regeneration?

[2 Marks]

(4)

Differentiate between regeneration and fragmentation.

[2 Marks]

Question 28.

When electric current flows in a purely resistive circuit, electrical energy gets fully converted into heat energy. The amount of heat produced (H) in the circuit is found to be directly proportional to (i) the square of current (I^2), (ii) the resistance (R) of the conductor, and (iii) the time (t) for which current flows. In other words, $H = I^2Rt$. Electrical devices such as an electric fuse, electric heater, electric iron, etc. are all based on this effect called heating effect of electric current.

(1) List two properties of electric fuse.

[1 Marks]

(2) List two properties of heating elements.

[1 Marks]

(3) Name the principle on which an electric fuse works and explain how a fuse wire is capable of saving electrical appliances from getting damaged due to accidentally produced high currents.

[2 Marks]

(4)

The power of an electric heater is 1100 W. If the potential difference between the two terminals of the heater is 220 V, find the current flowing in the circuit. What will happen to an electric fuse of rating 5 A connected in this circuit?

[2 Marks]