

Goa Board
Class X Science
Term 1
Sample Paper – 3 Solution

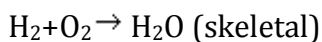
Time: 3 hrs

Total Marks: 90

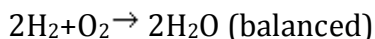
SECTION A

1. **Ans.** BHA and BHT are the common antioxidants used in foods to prevent rancidity.
2. **Ans.** Mitochondrion
3. **Ans.** The glass plate cover produces a greenhouse effect which helps to increase the temperature inside the box of the cooker. This heat cooks the food material kept inside.

4. **Ans.** A chemical equation is a short-hand method of representing a chemical reaction.



This equation has unequal number of atoms of the elements in the reactants and products.



This equation has equal number of atoms of elements in the reactants and products.

5. **Ans.**

(a)

(i) Wires not joined

(ii) Variable resistor/rheostat

(b) Potential difference between the terminals of an electric heater, $V = 60 \text{ V}$

Current, $I = 4 \text{ A}$

Resistance, $R = ?$

From Ohm's law, we have

$$R = \frac{V}{I} = \frac{60\text{V}}{4\text{A}} = 15\Omega$$

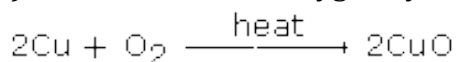
6. Ans.

The force is perpendicular to the plane of the page. The direction of force can be determined by the Fleming's left-hand rule.

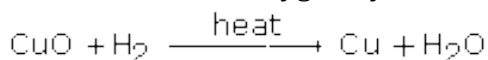
Fleming's left-hand rule is used to find the direction of this force. According to this rule, if we stretch the thumb, forefinger and middle finger of our left hand such that they are mutually perpendicular and if the first finger points in the direction of the magnetic field and the second finger in the direction of the current, then the thumb will point in the direction of the force acting on the conductor.

7. Ans.

(a) Oxidation: Gain of oxygen by a substance.



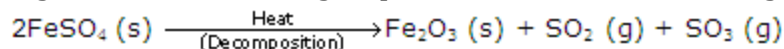
Reduction: Loss of oxygen by a substance.



(b) Sodium (Na) is oxidised to sodium oxide as it gains oxygen, and oxygen gets reduced.

8. Ans.

1. Take about 2 grams of ferrous sulphate crystals (green coloured) in a dry boiling tube.
2. Heat the boiling tube over a burner (by keeping the mouth of the boiling tube away from the face).
3. The green colour of ferrous sulphate crystals first changes to white and then a brown solid (ferric oxide) is formed.
4. Gas having the smell of burning sulphur comes out of the boiling tube.



9. Ans.

(a) Water of crystallisation is the number of water molecules which combine chemically in a definite molecular proportion with the concerned salt in the crystalline state.

(b) Two correct examples are

Copper sulphate, chemical formula = $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

Washing soda, chemical formula = $\text{Na}_2\text{CO}_3 \cdot 10 \text{H}_2\text{O}$

10.Ans.

- (a) When only one side of the plant is exposed to sunlight, auxin synthesised at the shoot diffuses towards the side of the plant which has not been exposed to the light, i.e. the shady region of the plant. This concentration of auxin stimulates the cells to grow longer on the side of the shoot which is away from light. Thus, the plant appears to bend towards light.
- (b) The experimental setup is for the experiment which has the objective: Response of the plant to the direction of light.

11.Ans.

- (a) We can show it by an experiment: Displacement reaction between copper and zinc.

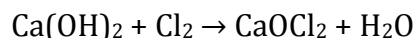
When a strip of zinc metal is placed in CuSO_4 solution, the colour of the blue copper sulphate solution fades gradually.

This proves that zinc being more reactive than copper displaces copper from the copper sulphate solution.

- (b) Cu is less reactive than hydrogen and is thus placed below hydrogen in the reactive series of metals; hence, it cannot displace hydrogen in dilute HCl.

12.Ans.

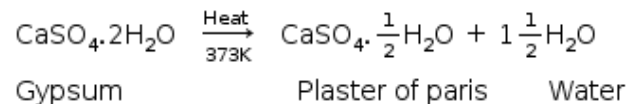
- (a) Bleaching powder:



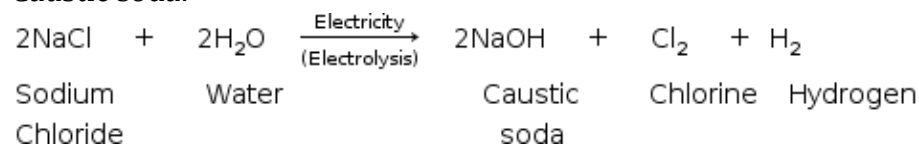
Calcium Chlorine Calcium Water
Oxide oxychloride

- (b)

Plaster of Paris:



- (c) Caustic soda:



13.Ans.

Limitations in harnessing the wind energy are as follows:

- (i) Wind energy farms can be set only at places where the wind blows for most part of the year.
- (ii) Wind harnessing requires a vast area of land to set up a wind farm.

(iii) The initial cost of the establishment of a wind farm is very high.

14.Ans.

Because R and 6 Ω resistors are in series, the same current flows through them.

According to Ohm's law, current $I = V/R$

$$\frac{6V}{R} = \frac{12V}{6\Omega} \Rightarrow R = 3\Omega$$

(i) The ammeter reading will be the same as the current through R.

According to Ohm's law, current $I = V/R$

$$\frac{6V}{3\Omega} = 2A$$

(ii) Potential difference across the battery terminals is $6V + 12V = 18V$.

15.Ans.

An electromagnet is a magnet consisting of a long coil of insulated copper wire wrapped around a soft iron core which is magnetised only when electric current is passed through the coil.

An electromagnet is a temporary magnet. Its polarity can be reversed by reversing the direction of current, whereas the polarity of permanent magnets is fixed.

Uses: Electric crane, electric bell

16.Ans.

(i) Mayank's sister is suffering from goitre.

(ii) The doctor advised her to eat iodised salt because it contains an appropriate amount of iodine which is required for the synthesis of the thyroxine hormone.

(iii) The function of thyroxine is to control the rate of metabolism of carbohydrates, fats and proteins in the body.

17.Ans.

(a) The heating elements of the electric toaster and electric iron are made of an alloy because

(i) Alloys have higher value of resistivity.

(ii) Alloys do not oxidise readily at high temperatures.

(b) Resistance $R = 20 \Omega$, Current $I = 5 A$, Time $t = 30 \text{ sec}$

$$\begin{aligned} H &= I^2 \times R \times t \\ &= (5)^2 \times 20 \times 30 \\ &= 25 \times 20 \times 30 \\ &= 500 \times 30 = 15000J \\ &= 15KJ \end{aligned}$$

18.Ans.

The solar cooker with a concave mirror reflector is more efficient.

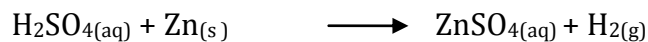
Because the concave mirror can focus the heat radiations to the material kept inside, and hence, it increases the temperature within.

A concave mirror is used in the headlights of vehicles or as a shaving mirror.

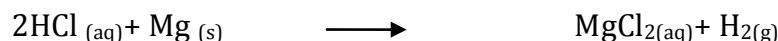
19.Ans.

(a)

(i) Sulphuric acid + Zinc $\longrightarrow$ Zinc sulphate + Hydrogen



(ii) Hydrochloric acid + Magnesium $\longrightarrow$ Magnesium chloride + Hydrogen



(b) A reaction in which an acid and a base react with each other to give a salt and water is termed a neutralisation reaction. In this reaction, energy is evolved in the form of heat.

(c) Uses of washing soda:

(i) Sodium carbonate (washing soda) is used in glass, soap and paper industries.

(ii) It is used in the manufacture of sodium compounds such as borax.

20.Ans.

(a)

Na 2, 8, 1

Na $\cdot$

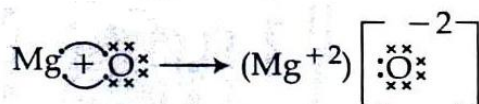
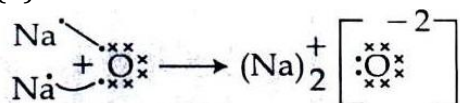
O 2, 6

$\cdot\ddot{\text{O}}\cdot$

Mg 2, 8, 2

$\cdot\text{Mg}\cdot$

(b)



(c) Na₂O: Na⁺ cation, O²⁻ anion

MgO: Mg²⁺ cation, O²⁻ anion

(d) Ionic compounds have high melting points because of strong inter-ionic attraction between the oppositely charged ions. Due to these strong forces, a lot of heat energy is required to break this force of attraction and melt the ionic compound.

21.Ans.

(a)

- (i) Momentary deflection in the galvanometer to one side.
- (ii) Momentary deflection in the galvanometer now in the opposite direction.
- (iii) No deflection in the galvanometer.
- (iv) The phenomenon involved is electromagnetic induction. The phenomenon in which an electric current is induced in a conductor because of a changing magnetic field is called electromagnetic induction.

(b)

An energy source which can be replenished in a short period of time is known as a renewable source of energy. These sources of energy are being produced continuously in nature and are inexhaustible. They are also known as inexhaustible sources of energy.

Examples: Solar energy, wind energy, ocean energy

22.Ans.

(a) Argon or Neon gas is filled in electric bulbs.

These gases are used because they are inactive or inert. This prolongs the life of the filament.

(b)

The property of a conductor because of which it opposes the flow of current through it is called resistance. The resistance of a conductor depends on

- (i) Length of the conductor: The resistance of a conductor is directly proportional to the length of the conductor.
- (ii) Area of cross-section: The resistance of a conductor is inversely proportional to its area of cross-section.
- (iii) Nature of the material of the conductor.
- (iv) Temperature of the conductor: Resistance of all pure metals increases with temperature and *vice versa*.

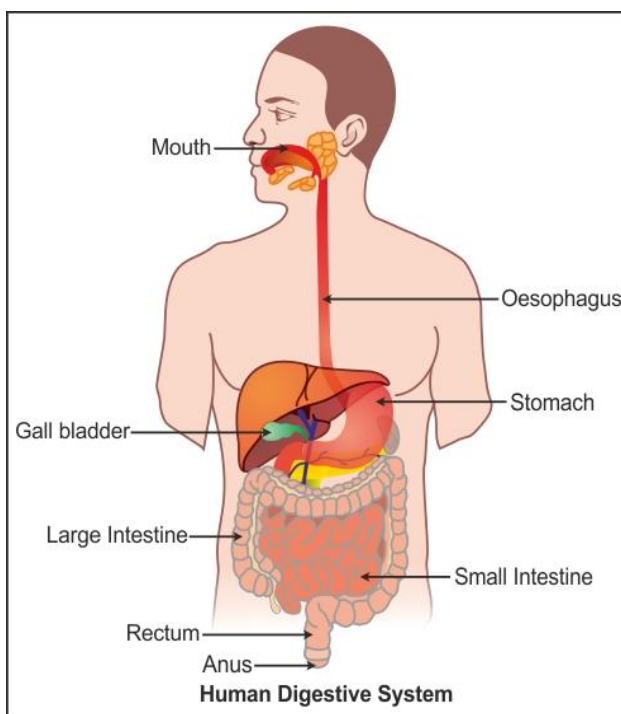
The SI unit of resistance is ohm (Ω).

(c) Ohm's law: At a constant temperature, the current flowing through a conductor is directly proportional to the potential difference across its ends.

23.Ans.

(a) Diagram of the human alimentary canal:

- (i) Part in which starch digestion starts: Mouth
- (ii) Part in which bile is stored: Gall bladder
- (iii) Part in which nutrients are absorbed: Small intestine
- (iv) Part in which water is absorbed: Large intestine

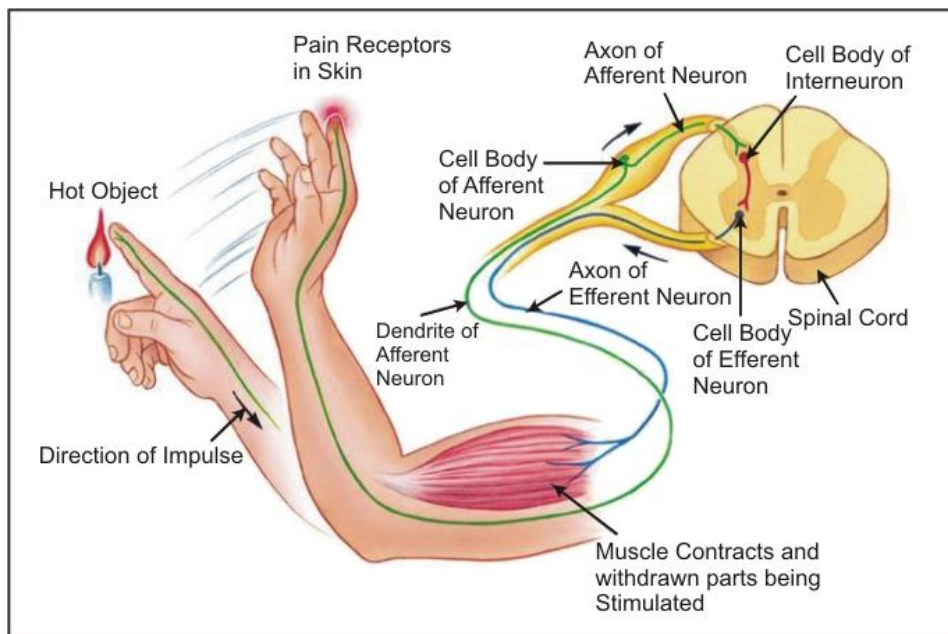


(b) Role of hydrochloric acid in the stomach:

- (i) Hydrochloric acid maintains the acidic environment in the stomach for the optimum activity of the pepsin which works best at pH 2.
- (ii) It helps to kill any invading pathogens especially bacteria present in the stomach.

24.Ans.

- (a) The spinal cord controls the reflex arcs.
(b) The sequence which occurs when we touch a hot object:



(c)

- (i) Dendrites acquire information.
(ii) The information travels in the form of an impulse or an electrical signal through neurons.

SECTION B

25.Ans. D. A mixture of ethyne and oxygen is used for gas welding. The reaction is highly exothermic in nature.

26.Ans. C. I, III and IV. Because being an acid, it cannot turn red litmus blue.

27.Ans. A. Green, because it is a salt and is neutral.

28.Ans. D. By Ohm's law, $I = V/R = 6/3 = 2$ A. Hence, an ammeter of range 0–2 A has to be used to read the value of current for this circuit.

29.Ans. B.

By Ohm's law, $V = IR$

$$R = V/I. \text{ Here, } R = \frac{\Delta V}{\Delta I}$$

$$\frac{0.9 - 0.6}{90 - 60} \times 10^3 = 10\Omega$$

30.Ans. D. In all three cases, R_1 , R_2 and R_3 are connected in series.

31.Ans. B. The voltmeter is not in the circuit. Current flows through the ammeter via resistor R and so ammeter shows a reading.

32.Ans. C. Safranin is used for staining and glycerine is used for mounting the leaf peel.

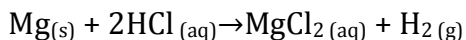
33.Ans. C. A: pale, B: blue black.

Because A region is covered with a strip, the starch present in it will be used and the region will also not photosynthesise. Because region B is uncovered, it will continue to photosynthesise, and hence, it will show the presence of starch.

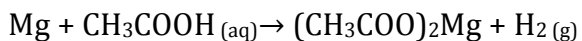
34.Ans. The given set is for the experiment to show that carbon dioxide is released during respiration. KOH absorbs CO_2 released during respiration by germinating seeds and creates a partial vacuum in the flask.

35.Ans. Fizzing in the reaction is due to the evolution of hydrogen gas by the action of metal on acid.

In test tube A:



In test tube B:



Because hydrochloric acid is a strong acid and acetic acid is a weak acid, evolution of H_2 gas occurs more readily in case of HCl.

36.Ans. Between points b_1 and c_1 , the two resistors are connected in series, and between points d_2 and c_2 , the two resistors are connected in parallel. Hence, student A will determine the equivalent resistance of the series combination, while student B will determine the equivalent resistance of the parallel combination of the two resistors. A rheostat controls the current in a circuit by varying the resistance.