

S O L U T I O N S

SAMPLE
QUESTION PAPER - 3

Solved _____

Time : 3 Hours

Maximum Marks : 90

SECTION 'A'

1. A number of windmills erected over a large area. 1
 2. If the electric current flowing through the magnetic field increases, the strength of the magnetic field increases. 1

3. Every current carrying conductor has a magnetic field around it. 1
 [CBSE Marking Scheme, 2012]

4. The force experienced by a current-carrying conductor that is kept in a magnetic field depends upon :

- (a) the direction of current through the conductor.
 (b) the direction of magnetic field in which the conductor is placed. 1 + 1
 5. (i) $4\text{H}_2\text{S} + 2\text{SO}_2 \longrightarrow 6\text{S} + 4\text{H}_2\text{O}$ ½
 (ii) $\text{CH}_4 + 4\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O}$ ½

To obey the law of conservation of mass; so that the number of atoms of each element before and after the reaction remain the same. 1

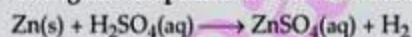
6. (a) $\text{Zn} + \text{H}_2\text{SO}_4 \longrightarrow \text{ZnSO}_4 + \text{H}_2$ 1
 (b) $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$ [CBSE Marking Scheme, 2012] 1

7. (i) **Change in colour** : Reaction between lead nitrate solution and potassium iodide solution.

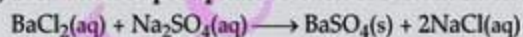


In this reaction, colour changes from colourless to yellow.

- (ii) **Change in temperature** : Action of dil. sulphuric acid on zinc.



- (iii) **Formation of precipitate** : Action of barium chloride on sodium sulphate.



[CBSE Marking Scheme, 2014] 1 + 1 + 1

8. (a) Calcium (20) – 2, 8, 8, 2 Oxygen (8) – 2, 6 1

$$\text{Ca} : \left(\begin{array}{c} \times \times \\ \times \times \end{array} \right) + \left(\begin{array}{c} \times \times \\ \times \times \end{array} \right) \longrightarrow [\text{Ca}^{2+}] \left[\begin{array}{c} \times \times \\ \times \times \end{array} \right]^{2-}$$
 1
 (b) Constituents metals of bronze – copper, tin. [CBSE Marking Scheme, 2012] 1

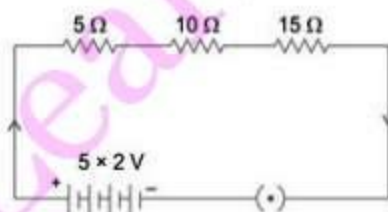
9. (a) The fumes evolved are brown in colour and the residue is white in colour. 1
 (b) Decomposition reaction. 1
 $2\text{Pb}(\text{NO}_3)_2 \longrightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$ 1

10. Alloys are homogeneous mixture of two or more metals or a metal and a non-metal that cannot be separated into their components by physical methods. 1
 (i) The electrical conductivity. ½ + ½
 (ii) Melting point of an alloy is less than that of a pure metal. ½ + ½
e.g., Brass and Bronze are not good conductors of electricity whereas copper is used in making electrical circuit. ½ + ½
e.g., Solder has a low melting point. [CBSE Marking Scheme, 2012]

11. (i) **At Cathode** : hydrogen gas (H_2) ½
At Anode : Oxygen gas (O_2) ½
 (ii) Since $2\text{H}_2\text{O} \xrightarrow{\text{Electric current}} 2\text{H}_2 + \text{O}_2$
 2 molecules of H_2 combine with 1 mol of O_2 to form H_2O , so the volume of H_2 , liberated is double that of O_2 . 1
 (iii) When a burning splinter is brought near the mouth of the liberated gases, the burning splinter extinguishes near H_2 gas while the burning splinter keeps burning more near the O_2 gas. 1

12. Work done = 10 Joules
 Charge = 2 Coulomb.
 Potential of point A = $V_A = \frac{10\text{J}}{2\text{C}} = 5\text{V}$
 Given, work done = 20 Joules
 Charge = 2 coulomb.
 Potential of Point B = $V_B = \frac{20\text{J}}{2\text{C}} = 10\text{V}$
 Potential difference between two point A and B is
 $V = V_B - V_A$
 $= 10\text{V} - 5\text{V} = 5\text{V}$
 Work done directly from A to B.
 Work done = Potential difference \times charge
 $= 5\text{V} \times 2\text{C}$
 $= 10\text{ Joules}$ [CBSE Marking Scheme, 2012] 2 + 1

13. The required circuit diagram is :



Applied potential difference,

$$V = 5 \times 2 = 10\text{V}$$

Total resistance

$$R = 5 + 10 + 15 = 30\ \Omega$$

$$\text{Current } I = \frac{V}{R} = \frac{10}{30} = 0.33\text{ A}$$

1½

1½

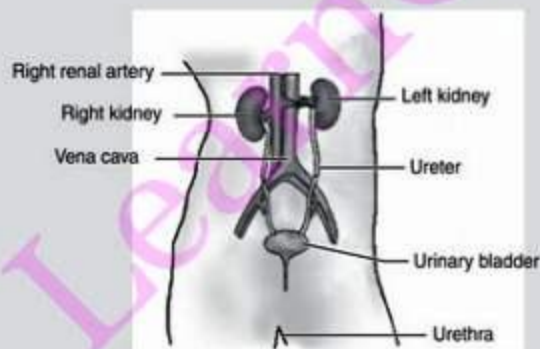
14. When the coil is moved towards a stationary magnet, the magnetic field associated with the coil will change and so current will be induced in the coil. This will cause galvanometer to show deflection in one direction. Now, when the coil is moved away, the magnetic field will decrease and hence, current will be induced in the opposite direction causing the galvanometer to show opposite deflection. The phenomenon is electromagnetic induction. 3
15. (i) Hormones are also known as chemical messengers as they act at a place different from the site of their manufacture.
 (ii) Their hyper and hyposecretion may cause disorder.
 (iii) They help in control and co-ordination of the activities of living organism. 1 + 1 + 1
16. (a) Aquatic animals obtain oxygen from water, present in dissolved state through their gills. Since dissolved oxygen is fairly low as compared to the oxygen present in the air. The rate of breathing in aquatic organism is much faster than seen in the terrestrial organism. 2
 (b) Salivary amylase, Breaks starch (complex sugar) to sugar. [CBSE Marking Scheme, 2012] 1
17. (a) Aditya is taking a correct decision. The value exhibited by Aditya is the 'awareness about energy conservation'. 1
 (b) The reasons are :
 (i) Solar water heater runs on renewable source of energy.
 (ii) Solar water heater saves electrical energy produced by burning fossil fuels. Thus, it helps in reducing global warming. 2
18. (a) The discarded material of nuclear industry such as remains of the radioactive products of nuclear reactions is called nuclear waste. 1
 (b) The waste material possess radioactive rays that emit particles. These particles can damage human, animal and plant tissues. 1
 (c) Nuclear wastes have to be buried deep inside the Earth. 1
19. **Difference between Aerobic and Anaerobic respiration :**

S. No.	Aerobic Respiration	Anaerobic Respiration
(i)	Occurs in the presence of oxygen.	Occur in the absence of oxygen.
(ii)	Releases large amount of energy.	Releases relatively small amount of energy.

1½ + 1½

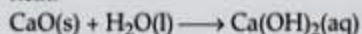
During sudden physical activity, there is a lack of oxygen in our muscles cells, the pathway for the breakdown of pyruvate into lactic acid that develops cramps in the body. 2

20. (a)



- (b) The purpose of urine formation is to filter out the nitrogenous waste such as urea or uric acid from the blood in the kidneys. 2
 (c) Glucose/water/amino acid/salts. [CBSE Marking Scheme, 2013] 1

21. (a) Quick lime reacts with water vigorously to produce slaked lime releasing a large amount of heat.



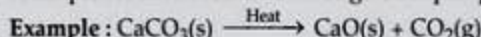
(Quick lime) (Slaked lime)

1



1

- (c) A simple reactant breaks down to give simpler products is known as decomposition reaction.

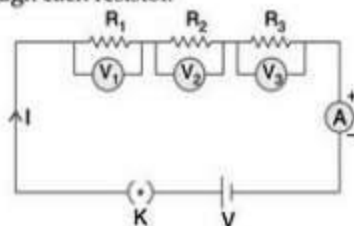


1

(Quick lime)

[CBSE Marking Scheme, 2010]

22. An applied potential V produces current I in the resistors R_1 , R_2 and R_3 , causing a potential drop V_1 , V_2 and V_3 respectively through each resistor.



Total Potential,
By Ohm's Law,

$$V = V_1 + V_2 + V_3$$

$$V_1 = IR_1$$

$$V_2 = IR_2$$

$$V_3 = IR_3$$

Thus,

$$V = IR_1 + IR_2 + IR_3$$

$$= I(R_1 + R_2 + R_3)$$

If R is the equivalent resistance, $V = IR$

Hence,

$$IR = I(R_1 + R_2 + R_3)$$

$$R = R_1 + R_2 + R_3$$

This proves that overall resistance increases when resistors are connected in series.

Three resistors 2Ω , 3Ω and 6Ω , joined in parallel combination.

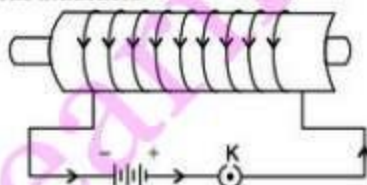
$$\begin{aligned} \frac{1}{R_p} &= \frac{1}{2} + \frac{1}{3} + \frac{1}{6} \\ &= \frac{3+2+1}{6} = \frac{6}{6} \end{aligned}$$

$$R_p = 1\Omega$$

4 + 1

23. The phenomenon of inducing current in a coil due to relative motion between the coil and a magnet is called electromagnetic induction.

1



1

Activity : Take a coil of insulated copper wire and join its free ends to a galvanometer. On moving the magnet towards the coil, the galvanometer will show deflection as shown in the figure, confirming the induction of current. On moving the magnet away from the coil, the galvanometer will show deflection in the opposite direction. But, the galvanometer shows no deflection when the magnet is kept stationary.

1

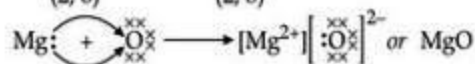
The factors are :

- (i) strength of the magnetic field
- (ii) relative speed between the magnet and the coil

1 + 1

24. (a) (i) Ionic compounds have high melting and boiling points. It is because of strong force of attraction between oppositely charged ions, therefore high energy is required to break the metallic bonds between ions.
- (ii) Ionic compounds are soluble in water because they form ions in aqueous solutions.
- (iii) Ionic compounds conduct electricity in molten state and in aqueous solution because ions carry current. The movement of ions takes place towards oppositely charged electrode in electric field.

(b) MgO :



MgO has Mg^{2+} and O^{2-} ions.

3 + 2

SECTION 'B'

25. (D) Zinc is more reactive than Fe and Cu, so it can displace Fe and Cu from their FeSO_4 and CuSO_4 solution respectively. 1
26. (B) Antacid is basic in nature. 1
27. (A) Structural truth. 1
28. (B) Iodine turns starch to blue-black. 1
29. (C) Less than the final level. 1
30. (D) Requirement of the experiment. 1
31. (B) Question is ambiguous. Use of (.) for key will create confusion. It is not given whether the keys are closed or not. If key K is closed and the other key in the main circuit is closed, both the meters will work. Otherwise, considering the key to be open, voltmeter will show no reading. 1
32. (A) Number of cells used. 1
33. (B) Zero error $\rightarrow +4 \text{ mA}$, $+0.2 \text{ V}$
 Least count $\rightarrow \frac{30-0}{15} = \frac{30}{15} = 2 \text{ mA}$, $\frac{2-0}{10} = \frac{2}{10} = 0.2 \text{ V}$ 1
34. Preparation of lime water : Shake 5 g calcium oxide (CaO), with 100 ml water. Allow it to stand for about 24 hours. Decant the supernatant liquid and use it for the tests. It is suggested to always use freshly prepared lime water. 2
35. $A_1 < A_2$.
Reason : In parallel combination, current depends on resistance, $I \propto 1/R$ i.e., more the resistance less is the current. 2
36. In the experiment, the black paper used for covering prevents light. The inference is that light is necessary for photosynthesis. 2

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