

SCIENCE (Theory)

Class – X

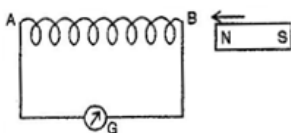
(Solutions)

CBSE Sample Paper-01
SUMMATIVE ASSESSMENT –I
SECTION-A

- When a chemical reaction occurs, new products are obtained.
- Chlorophyll.
- It remains same because resistivity depends on nature of material.
- (a) Sulphurous acid is formed.

$$\text{SO}_2 + \text{H}_2\text{O} \longrightarrow \text{H}_2\text{SO}_3 \text{ (Sulphurous acid)}$$
 (b) Limewater turns milky due to formation of calcium sulphate.

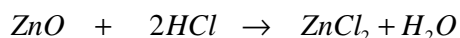
$$\text{SO}_2 + \text{Ca(OH)}_2 \longrightarrow \text{CaSO}_3 + \text{H}_2\text{O}$$
- (i) Thyroxine hormone (ii) Calcitonine hormone
 (iii) Adrenaline hormone (iv) Vasopressin hormone
- Connect a coil AB of wire having a number of turns. Connect it to a sensitive galvanometer as shown in figure.



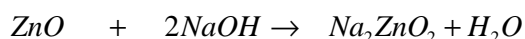
Move a bar magnet towards the coil. When North Pole is taken fast towards or South Pole is taken fast towards the coil, the deflection occurs in the galvanometer but will be in opposite direction. When the coil and magnet both are stationary, there is no deflection in the galvanometer. Thus the motion of a magnet, with respect to the coil, produces an induced potential difference which sets up an induced electric current in the circuit.

- (a) $\text{H}_2 \longrightarrow 2\text{H}^+ + 2e^-$ (Oxidation)
 Substance getting oxidized is H_2 .
 $\text{Cl}_2 + 2e^- \longrightarrow 2\text{Cl}^-$ (Reduction)
 Substance getting reduced is Cl_2 .
 (b) $\text{Cu}^{2+} + 2e^- \longrightarrow \text{Cu}$ (Reduction)
 Substance getting reduced is Cu .
 $\text{H}_2 \longrightarrow 2\text{H}^+ + 2e^-$ (Oxidation)
 Substance getting oxidized is H_2 .
 (c) $2\text{S}_2^{2-} \longrightarrow 2\text{S} + 4e^-$ (Oxidation)
 Substance getting oxidized is H_2S .
 $\text{S}^{4+} + 4e^- \longrightarrow \text{S}$ (Reduction)
 Substance getting reduced is SO_2 .

8. It is a redox reaction because Ferrous (Fe^{2+}) is getting oxidized to Ferric (Fe^{3+}) whereas SO_4^{2-} is getting reduced to SO_2 .
9. (a) CaOCl_2 , Calcium oxychloride
(b) $\text{CaOCl}_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{Cl}_2$
(c) It is used as disinfectant in water treatment plants.
10. (a) Solar panels
(b) Solar energy.
(a) Because Rajasthan gets a lot of sunshine throughout the year.
(b) Solar cell.
(c) General awareness, concern for the environment to improve it, desire to help people.
11. (a) Zinc oxide (ZnO) is called amphoteric oxide as it behaves both as acidic oxide and basic oxide.



(Basic oxide) (Acid) Zinc chloride



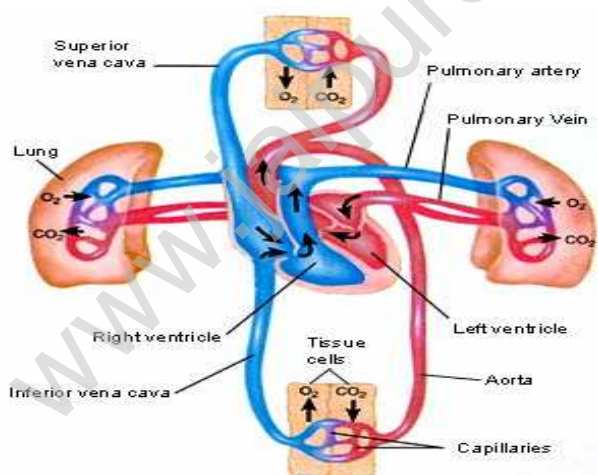
(Acidic oxide) (Base) (Sodium zincate)

Aluminum oxide (Al_2O_3) is another amphoteric oxide.

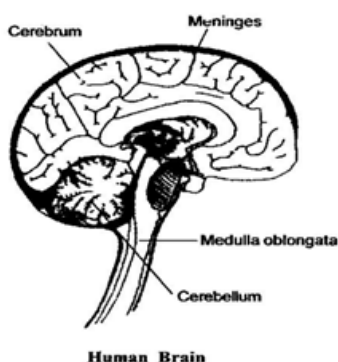
(b) Water soluble hydroxides of metals are known as alkalies. For example NaOH

12. Transportation of oxygen and carbon – dioxide occurs with the help of respiratory pigment haemoglobin. Haemoglobin is a red pigment having very high affinity for oxygen. Oxygen is transported from the lungs to the body cells in the form of oxyhaemoglobin. Carbon – dioxide is transported from the body cells to the lungs in the form of carbamino – haemoglobin

13.



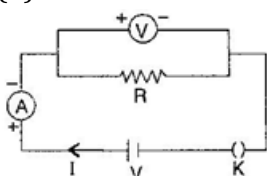
14.



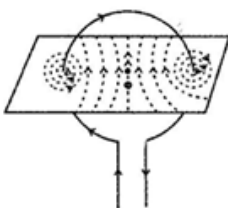
Human Brain

15. (a) Ohm's law: Under similar physical conditions, such as temperature remains constant, the current flowing through a wire is directly proportional to the difference in potential applied across its ends, i.e., $I \propto V$. or $V = IR$ where R is the resistance offered.

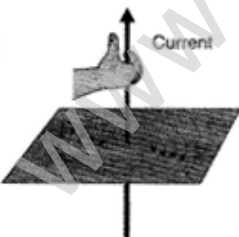
(b)



16. To detect the presence of the magnetic field created by the current in a circular loop at the centre, one can draw the magnetic field lines with the help of compass needle. The magnetic field lines appear as a straight line at the centre and other lines appear in the same direction without the loop.



Right hand thumb rule: Hold the wire in your right hand with your extended thumb pointing in the direction of current. Your folded fingers will indicate the direction of magnetic field around the wire.



17. (a) **Anaerobic decomposition:** The process in which the complex compound of cow dung slurry decomposes or breaks down in the absence of oxygen by anaerobic micro organisms called anaerobic bacteria is known as anaerobic decomposition.

Steps involved in obtaining biogas:

- (i) Slurry is made by mixing of animal dung with an equal amount of water.

- (ii) Slurry is passed through an inlet chamber of an underground digester tank.
 - (iii) In digester tank, slurry is decomposed by anaerobic bacteria in about 50-60 days to produce biogas.
 - (iv) The biogas collected in domes built over the digester tank and has a gas outlet with valve.
 - (v) The pressure exerted by the biogas on the slurry forces the spent slurry to the overflow tank via outlet chamber.
 - (vi) The spent slurry is periodically removed and used as a good manure.
 - (vii) The whole process is repeated again for regular supply of biogas.
- (b) ${}_{92}^{235}\text{U}$ can undergo fission readily.
18. (a) Conversion efficiency is less.
- (b) Approximately 15 km/h.
- (c) The process in which the heavy Uranium nucleus splits into lighter nuclei of smaller atomic numbers is called Nuclear fission.
- $${}_{92}^{235}\text{U} + {}_0^1\text{n} \longrightarrow {}_{56}^{141}\text{Ba} + {}_{36}^{92}\text{Kr} + 3{}_0^1\text{n} + Q$$
- Q refers to the energy of 200 MeV released.
19. (a) Double displacement reaction, precipitation reaction.
- (b) Combination reaction, oxidation reaction.
- (c) Thermal decomposition
- (d) Displacement reaction
- (e) Combination and exothermic reaction

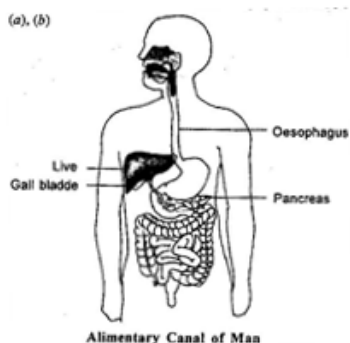
Or

- (i) Silver is very less reactive metal. So it does not react with dilute HCl.
 - (ii) The reaction of Al with dilute HCl is exothermic i.e. heat is produced in the reaction, so the temperature of the reaction mixture rises.
 - (i) Sodium is a very reactive metal. It react vigorously with the evolution of heat too.
 - (ii) Bubbles are seen due to the evolution of H_2 gas.
- $$\text{Pb}(s) + 2\text{HCl}(aq) \longrightarrow \text{PbCl}_2 + \text{H}_2(g)$$
- (iii) CO_2 gas is produced when Na_2CO_3 reacts with dilute HCl.
- $$\text{Na}_2\text{CO}_3(s) + 2\text{HCl}(aq) \longrightarrow 2\text{NaCl}(aq) + \text{H}_2\text{O}(l) + \text{CO}_2(g)$$
20. (a) It is due to presence of free electrons.
- (b) Metals are good reducing agents and H_2 is weak oxidizing agent therefore, metals do not react with hydrogen to form hydrides.
- (c) $\text{Zn} + \text{CuSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Cu}$
- It is due to formation of $\text{ZnSO}_4(aq)$ which is colourless.
- (a) It increases electrical conductivity and molten cryolite acts as a solvent.
 - (b) It prevents oxidation of food which prevents its spoilage.

Or

- (a) Corrosion of metal is a process in which metal reacts with substances present in atmosphere to form surface compounds. 'Al' does not corrode whereas 'Fe' corrodes when placed in atmosphere.
- (b) Take three test tubes and put iron nails in each of them. In the first test tube add H_2O up to brim and leave no space for air. In the second test tube add fused $CaCl_2$ so as to absorb moisture. In the third test add water and leave space for air. Leave them for few days. Rusting will not take place in first and second test tubes. But rusting will take place in third test tube showing that rusting of iron requires both air and moisture.

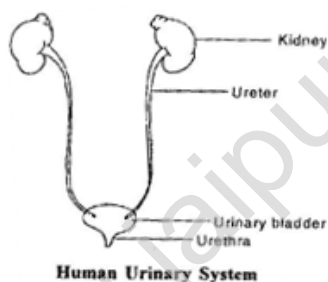
21.



- (c) The function of the enzyme 'pepsin' in the digestion process is that it breaks down proteins into peptones in acidic medium of gastric juice.

Or

(i)



- (ii) The two major components of normal human urine are water and nitrogenous substances, most of which is urea.
22. (a) The earth wire helps us by offering a low resistance path to the high potential that might have come in contact with the body or other unwanted part of the device. This will not bring any damage to the device or to the person handling the device. The fuse may disconnect the electrical link in such cases.
- (b) Overloading is the situation which causes a sudden draw of larger current by the electrical appliances, when operated at the same time from a single parallel connection. In short-circuit the live wire comes in contact with the neutral line. This gives a large drop of potential and flow of current through the fuse wire. So it burns.
- (c) (i) 5 A (ii) 15 A

Or

- (a) The SI unit of electric current is ampere (A). When 1 coulomb of electric charge flows through any cross-section of a conductor in 1 second, the electric current flowing through it is said to be 1 ampere.

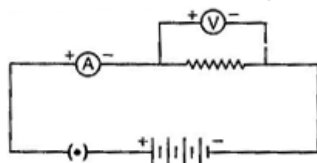
$$1 \text{ ampere (A)} = \frac{1 \text{ coulomb (C)}}{1 \text{ second (s)}}$$

- (b) **Aim:** To establish the relationship between potential difference across the resistor and current passing through it.

Apparatus required: Nichrome or eureka wire (length 0.5 m) , an ammeter, a voltmeter and four cells if 1.5 V each.

Procedure:

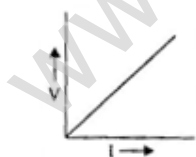
- Set the circuit as shown in the figure.
- First use only one cell as the source and note the reading of the ammeter and voltmeter.
- Now connect two cells in series and note the reading of the ammeter and voltmeter again.
- Now connect three cells in series in the circuit and again take the reading of both devices.
- Lastly connect fourth cell in series in the circuit also note the reading of the ammeter and voltmeter again.



Observation: In this activity, we will observe that the current increases with potential difference, i.e. more cells being connected in series. We will get approximately the same value for $\frac{V}{I}$ in each case and we will also obtain straight line graph of V vs I passing

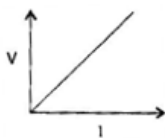
through the origin as shown in figure. From the graph, we observe that

$$\frac{V}{I} = \text{constant,} \quad \text{i.e. } V = \text{constant} \times I \quad \text{or} \quad V \propto I$$



Conclusion: The constant is called Resistance. If we change the wire, the graph will vary but remain a line with a different slope/resistances.

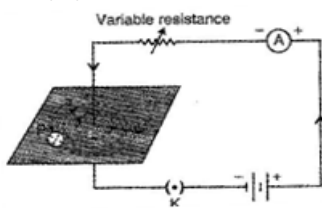
- (c) Shape of the V-I curve is a straight line passing through the origin as shown in figure.



23. (a) **Magnetic field:** Surrounding a magnet its influence is felt by any other magnetic element. It may be an attractive or a repulsive influence.
- (b) The direction of magnetic field at a point is determined by drawing a tangent at that point. The direction of tangent gives the direction of magnetic field.
- (c) **Aim:** To demonstrate the direction of the magnetic field generated around a current carrying conductor.

Procedure:

- Obtain the concentric circles pattern of iron filings around the copper wire by flowing current through it as shown.
- Place a magnetic needle (compass) at any point (P) over a circle.
- Observe the direction of needle.
- Show the direction by arrows.



Conclusion: The direction of the north pole of the compass needle would give the direction of the field lines produced by the electric current through the straight wire at that point.

- (d) The direction of the field is perpendicular to the plane of the coil and directed inwards for the clockwise current flowing. For anticlockwise current, it will be outwards.

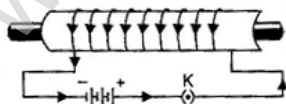
Or

- (a) **Magnetizing a material:** When a material like soft iron, is placed inside a coil carrying current (may be a solenoid), it will get magnetized. Once the current is put-off, the magnetic field will also be lost. Such magnets are called electromagnets.

- (b) **Two uses of electromagnet:**

- In electric bells.
- For sorting scrap metal.

- (c)



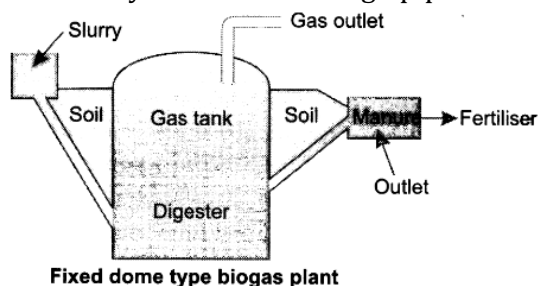
- (d) The purpose of soft iron core used in making an electromagnet that:

- It is temporary magnetized.
- It retains magnetism as long as current flow is maintained.
- It will ensure an uniform and stronger field.

24. Biogas is a mixture of methane, carbon dioxide, hydrogen and hydrogen sulphide. The major constituent of biogas is methane. Biogas is produced by the anaerobic degradation of animal wastes like cow-dung or plant wastes in the presence of water.

The biogas plant has a dome-like structure built with bricks. A slurry of cow-dung and water is made in the mixing tank from where it is fed into the digester. The digester is a sealed chamber in which there is no oxygen.

Anaerobic micro-organisms that do not require oxygen decompose or break down complex compounds of the cow-dung slurry. It takes a few days for the decomposition process to be complete and generate gases. The biogas is stored in the gas tank above the digester from which they are drawn through pipes for use.



Or

- (a) It is because a piece of fresh wood is not dry and therefore it is to be heated at high temperature before it catches fire that is why it is difficult to burn.
- (b) It cuts off the supply of air (oxygen) which is required for combustion to take place.
- (c) Hydrogen is highly combustible and burns with an explosion, therefore, it is difficult to store and transport.
- (d) Charcoal, has higher calorific value than wood and produces less smoke than wood.

Section - B

25. The solution remains colourless because HCl is acid and It does not react with phenolphthalein.
26. (a) Transpiration.
- (b) Water loss due to evaporation from the plane is called transpiration.
27. No change will be there i.e. the resistivity ' ρ ' will be same because it is a material constant.
28. (b)
29. (b)
30. (a)
31. (b)
32. (b)
33. (c)
34. (a)
35. (c)
36. (b)