# LIBERTY PAPER SET

**STD. 10 : Science [N-011(E)]**

**Full Solution**

**Time : 3 Hours** **ASSIGNTMENT PAPER 9**

## Section-A

**1.** (B) Cu and Sn **2.** (D) Glycerine **3.** (A) 1/5Ω **4.** (A) Infinite **5.** (B) 3:1 **6.** (B) Mitochondria **7.** HgS **8.** Ethanoic acid **9.** lymph **10.** Ciliary muscles **11.** Insuline **12.** Cervix **13.** False **14.** True **15.** False **16.** True **17.** True **18.** False **19.** Tartaric Acid **20.** "X" chromosomes are of X shape large size "Y" chromosomes are small in size. **21.** Capacity OR Ability of an eye lens of changing its focal length at maximum is called its power of Accomodation. **22.** Testosterone **23.** (a) Spontaneous **24.** (c) Vegeterian

## Section-B

**25.** ➤ When fats and oil are oxidised, it becomes rancid and their smell and taste change. This is called rancidity.

➤ **Preventing Measures :** Add antioxidants that are resistance to oxidation to prevent rancidity. Therefore, inert gas like nitrogen are is added to the potato chips to prevent its rancidity.

**26.** ➤ (a) Which metals react with water vigourously?

➤ Sodium (Na) and Potassium (K)

➤ (b) Which metals do not react with cold-water?

➤ Magnesium (Mg)

➤ (c) Which metals react with water-steam and forms hydrogen gas?

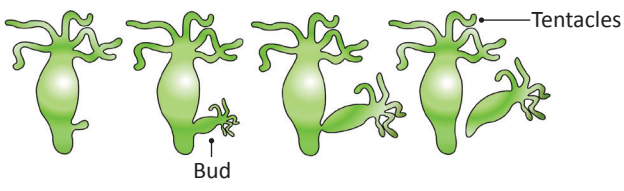
➤ Aluminum (Al), Iron (Fe) and Zinc (Zn)

**27.** ➤ Mouth, Esophaugs. Stomach, Small Intestine, Large Intestine, Rectum.

➤ Starch in the mouth and protein in the stomach are partially digested.

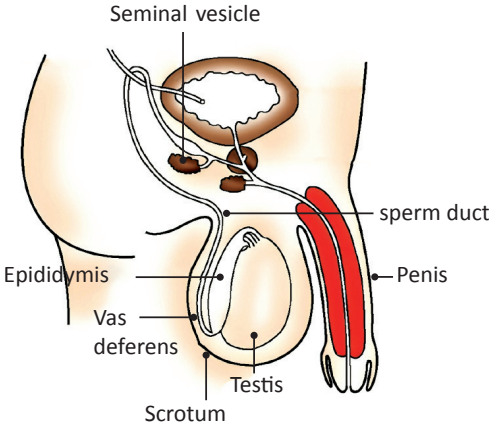
**28.** ➤ A type of asexual reproduction in which a New individual or branch develops from an outgrowth on the body of a plant or certain lower animals. A form of asexual reproduction in living organisms is in which new individuals form from outgrowths (buds) on the bodies of mature organisms.

▸ **Budding in Hydra**



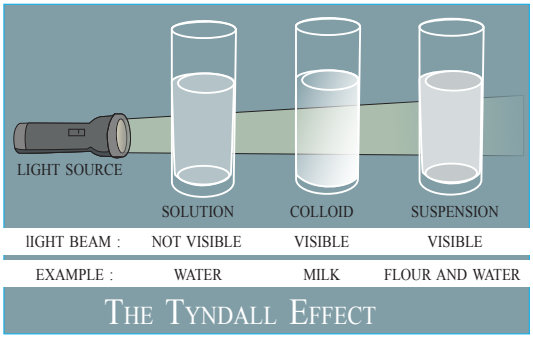

➤ Organisms such as hydra use regenerative cells for reproduction in the process of budding. In hydra, a bud develops as an outgrowth due to repeated cell division at one specific site. These buds develop into tiny individuals and when fully mature, detach from the parent body and become new independent individuals.

**29.**




**30.** ➤ When a beam of light strikes such fine particles, the path of the beam becomes visible. The light reaches us, after being reflected diffusely by these particles. The phenomenon of scattering of light by the colloidal particles gives rise to Tyndall effect.

➤ This phenomenon is seen when a fine beam of sunlight enters a smoke-filled room through a small hole. Thus, scattering of light makes the particles visible. Tyndall effect can also be observed when sunlight passes through a canopy of a dense forest.




➤ The colour of the scattered light depends on the size of the scattering particles.

➤ Very fine particles scatter, mainly blue light, while particles of larger size scatter light of longer wavelength.

➤ If the size of the scattering particles is large enough, then the scattered light may even appear white.

**31.** ➤ **Advantages of Parallel connection :**

➤ In parallel combination each appliance gets the full voltage.

➤ It one appliance is switched on/off other one is not affected.

➤ The parallel circuit divide the current through the appliances each appliance gets proper current depending on its resistance.

➤ In a parallel combination it is very easy to connect or disconnect a new appliance without affecting the working of other appliances.

**32.** ➤ Mathematically, resistivity of the conducting material is given by

➤ $\rho = Rx\ A/l$

➤ If $l$ = 1m, A = 1 sq.m then $\rho = R$

➤ Hence, the resistivity of the material is defined as the resistance offered by a metallic wire having a unit length and a unit area of cross-section.

➤ Since unit length and unit area of cross-section forms a cube, the specific resistance or resistivity can also be defined as the resistance offered by a cube of a material of side 1 m when current flows perpendicularly through the opposite faces. In SI system, its units is

$$\text{Unit of } \rho = \frac{\text{Unit of R} \times \text{Unit of area}}{\text{Unit of length of conductor}}$$

$$= \frac{\Omega \times m^2}{m} = \Omega m$$

**33.** ➤ The following precautionary measures should heva been taken by Ramanbhai to prevent the fire due to overloading in the domestic electrical circuit :

- ➤ A suitable fuse connected in the electrical circuit.
- ➤ The insulating layer on live and neutral wire should be properly laid.
- ➤ No more than one device should be connected in the same socket.
- ➤ Each device should be connected in parallel with each-other.
- ➤ The circuit of the house should be properly earthened with devices made of metal.

**34.** ➤ The energy that is captured by the autotrophs does not revert back to the solar-system and the energy which passes to the herbivores does not come back to autotrophs.

- ➤ As it moves progressively through the various trophic levels, it is no longer available to the previous level.
- ➤ The energy available at each trophic level gets diminished progressively due to loss of energy at each level so the flow of energy is unidirectional.

**35.** (a) Eco system (b) Trophic Level

**36.** ➤ In birds and mammals have a double circulation system where both the oxygenated and deoxygenated blood maintains separate.

- ➤ Warm-blooded animals such as birds and mammals maintain constant body temperature by cooling themselves when they are in a hotter environment and warming their bodies when they are in a cooler environment.
- ➤ Hence, these animals require more oxygen ($O_2$) for more cellular respiration to produce more energy to maintain their body temperature.
- ➤ They must separate oxygenated and de-oxygenated blood so that their circulatory system is more efficient and can maintain their constant body temperature.
- ➤ It is also better to have oxygenated blood separate, as its combination with deoxygenated blood will impure the entire blood.

**37.** **Properties of magnetic lines of force :**

- ➤ Field lines arise from North Pole and end into South Pole of the magnet.
- ➤ Field lines form circular loop.
- ➤ Field lines are closer in stronger magnetic field.
- ➤ Field lines never intersect each other as for two lines to intersect; there must be two North directions at a point, which is not possible.
- ➤ As we go far from magnets, intensity of magnetic field lines gets decreased.

## Section-C

**38.** **(i)** $CuO + H_2 \rightarrow Cu + H_2O$

- ➤ **Type of Reaction :** Redox reaction.

**(ii)** $Pb(s) + CuCl_2(aq) \rightarrow PbCl_2(aq) + Cu(s)$

- ➤ **Type of Reaction :** Displacement Reaction.

**(iii)** $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$

- ➤ **Type of Reaction :** Exothermic Reaction

**(iv)** $C(s) + O_2(g) \rightarrow CO_2(g)$

- ➤ **Types of Reaction :** Combination Reaction.

**(v)** $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

- ➤ **Type of Reaction :** Decomposition Reaction.

**(vi)** $Na_2SO_4(aq) + BaCl_2(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$

- ➤ **Type of Reaction :** Double displacement reaction.

**39.** Iron, zinc, lead etc. are moderately reactive and fall in the middle of the reactivity series.

- These metals are found in the form of their sulphides or carbonate in the nature.

**Example :**

- (i) Extraction of zinc metal.

Zinc metal is found in the form of Zinc blend (ZnS) and in the form of calamine [$Zn(CO)_3$]

- (ii) Roasting of Zinc Blend.

Zinc blend first converted into zinc oxide by process of Roasting.

- ZnS is first heated strongly in the presence of excess of air.

| $2ZnS$ | + | $3O_2(g)$ | $\xrightarrow{Heat}$ | $2ZnO(s)$ | + | $2SO_2(g)$ |
|---|---|---|---|---|---|---|
| Zinc Sulphate | | Oxygen | | Zinc oxide | | Sulphur dioxide |

- (iii) Calcination of calamine ore :
- Calamine [Zn(CO)3] is heated in limited air.

Calamine [Zn(CO3)] is converted in zinc oxide.

This known as calcination.

| $Zn(CO_3)(s)$ | $\rightarrow$ | $ZnO(s)$ | + | $CO_2(g)$ |
|---|---|---|---|---|
| Zinc carbonate | | Zinc oxide | | carbon dioxide |

- (iv) Reduction of Zinc-oxide to obtain zinc metal.
- In this process, zinc oxide is heated with a reducing agent, such as carbon to convert zinc oxide into zinc metal.

| $ZnO(s)$ | + | $C(s)$ | $\xrightarrow{Heat}$ | $Zn(s)$ | + | $CO(g)$ |
|---|---|---|---|---|---|---|
| Zinc oxide | | carbon | | Zinc | | Carbon monoxide |

- Apart from carbon many other reducing agents are used to obtain metals from respective oxides.
- In displacement reactions, highly reactive metals, such as Sodium, Calcium, Aluminum etc. are used as reducing agent.

**40. (a) Reaction of metal with Oxygen ($O_2$) :**

- All metals react with Oxygen ($O_2$) and forms a metal oxide

metal + oxygen $\rightarrow$ metal oxide

- **Example :**
- When copper is heated in the presence of air, a black colour layer is of copper (II) oxide is formed over it

| $2Cu$ | + | $O_2$ | $\rightarrow$ | $2CuO$ |
|---|---|---|---|---|
| Copper | | Oxygen | | Copper(II)Oxide |

- When aluminum metal is heated in air it forms aluminum oxide.

| $4Al$ | + | $3O_2$ | $\rightarrow$ | $2Al_2O_3$ |
|---|---|---|---|---|
| Aluminium | | Oxygen | | Aluminium Oxide |

- **(b) Reaction of metal with acid :**
- When metal react with acid it forms a salt and hydrogen gas.

Metal + dilute acid $\rightarrow$ Salt + Hydrogen

- **Example :**

(i)

| $Zn(s)$ | + | $2HCl$ | $\rightarrow$ | $ZnCl_2(aq)$ | + | $H_2(g)$ |
|---|---|---|---|---|---|---|
| Zinc | | dilute hydrochloric acid | | Zinc chloride | | Hydrogen |

(ii)

| $Mg(s)$ | + | $H_2SO_4(aq)$ | $\rightarrow$ | $MgSO_4(aq)$ | + | $H_2(g)$ |
|---|---|---|---|---|---|---|
| Magnesium | | dilute Sulphuric acid | | Magnesium sulphate | | Hydrogen |

**41.** ➤ **Frontal brain :** (i) Hearing (iv) Vision (v) Odor

➤ **Posterior brain :** (ii) salivation (iii) blood-pressure (vi) Vomiting

**42.** a. New plants produced by vegetative propagation maintain the desirable characters of the parents plants. These plants are genetically identical.

b. Certain plants like bananas, grapes, pineapples, roses, jasmines, etc., do not form seeds. Thus, this is the only method of reproduction and continuation of such species.

c. This method is cheap and can be easily employed to reproduce plants, especially fruit plants.

d. Only one parent is required for reproduction.

**43.** ➤ In multi-cellular organisms with relatively simple body organization, simple reproductive methods can still work.

➤ For example - Spirogyra : simply breaks up into smaller pieces upon maturation.

➤ These pieces grow into new individuals.

➤ This is not true for all multi-cellular organism.

➤ They cannot divide cell by cell.

➤ The reason is that many multi-cellular organism, are not simply a random collection of cells.

➤ Specialized cells are organized as tissues, and tissues are organized into organs, which then have to be placed at definite positions in the body.

➤ In such a carefully organized situation, cell by cell division would be impractical.

➤ Therefore, multi-cellular organism need to use more complex ways for reproduction.

**44.** **(a)** (i) The incident ray, the refracted ray and normal to the interface of two transperant medium at the point of incident, all lie in the same plane.

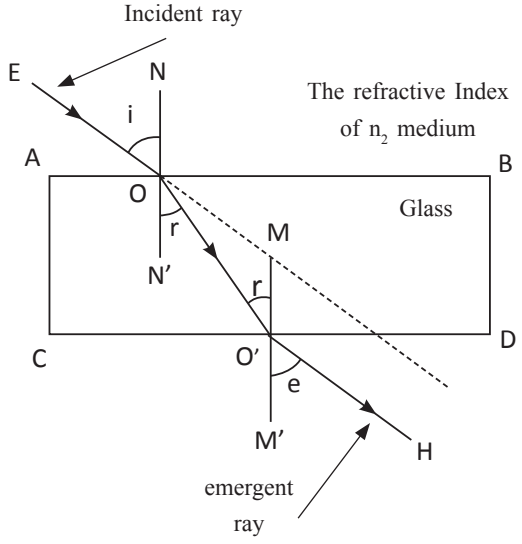
(ii) The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for a light of given colour and for the given pair of the media.

➤ This law is also known as Snell's law of refraction.

➤ This is true for angle $0 < i < 90°$

➤ $\frac{\sin i}{\sin r}$ = constant

**(b)** (a) $n_1 > n_2$



**45.** ➤ +4.0D is written in prescription that means the power of the lens P = +4.0D

➤ Since the power of the lens is positive, Suresh has to make a convex lens

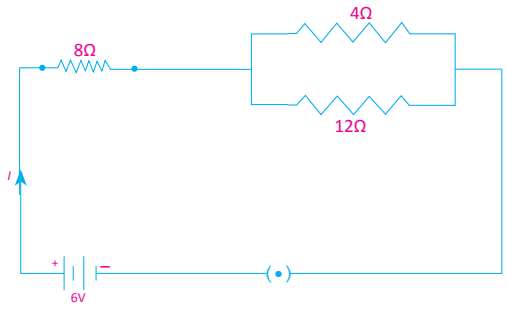
Now,

focal-length of the lens $f = \frac{1}{P} = \frac{1}{4} = 0.25$ m

$= (0.25 \times 100)$ cm

$= +25$ cm

**46.**




➤ Here, $R_1 = 8\Omega$, $R_2 = 4\Omega$, and $R_3 = 12\Omega$

➤ Resistor $R_2$ and $R_3$ are connected in parallel and Rp is equivalent resistor so,

➤ $\frac{1}{R_p} = \frac{1}{R_2} + \frac{1}{R_3}$

➤ $= \frac{1}{4} + \frac{1}{12}$

➤ $= \frac{3+1}{12}$

➤ $\therefore \frac{1}{R_p} = \frac{4}{12}$

➤ $\therefore R_p = \frac{12}{4}$

➤ $\therefore R_p = 3\Omega$

➤ Now, $R_p$ and $R_1$ are connected in series So, $R_s$ is equivalent resistor of R and $R_p$

➤ $R_s = R_1 + R_p$

➤ $= 8 + 3$

➤ $= 11\Omega$

➤ So, equivalent resistance of circuits is $11\Omega$

**47.** ➤ Sodium Hydroxide is formed by the process of chlor Alvalli. also, produce chlorine Gas.

$\therefore$ X = Chlorine Gas

$2Nacl + 2H_2O \rightarrow 2NaOH + Cl_2 + H_2$

➤ Bleaching powder is used $CaOcl_2$ as bleeding agent

$\therefore$ Y = Bleaching Powder $CaOcl^2$

➤ reacts with Ca $(OH)_2$ to form $Caocl_2$

**48.** ➤ **Preparation of plaster of Paris**

➤ It is prepared from gypsum. Plaster of Paris is prepared by heating gypsum to a temperature of 373K. When gypsum is heated to a temperature of 373K, it loses three-fourths of its water of crystallization and forms Plaster of Paris.

$CaSO_4 \cdot 2H_2O \xrightarrow{373\ K} CaSO_4 \cdot \frac{1}{2} H_2O + \frac{3}{2} H_2O$

Gypsum Plaster of paris

➤ Plaster of Paris is a white powder and on mixing with water, it changes to gypsum once again giving a hard mass.

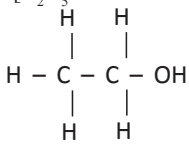
$$CaSO_4 \cdot \frac{1}{2}H_2O + 1\frac{1}{2}H_2O \rightarrow CaSO_4 \cdot 2H_2O$$

Plaster of paris water Gypsum

- **Uses :**
- As a plaster to regenerate broken bones by physicians.
- To make toys and sculpture
- To make decorative materials.
- To smooth en the surface of the wall.

**49.** (i) Which one out of organic compounds A, B, C, D and E is a saturated hydrocarbon?

- Organic compound B ($C_2H_5$ - Ethane) is saturated hydrocarbon.
- (ii) From the above, identify the alcohol organic compound and write its moleculer formula.
- Organic compound C [$C_2H_5OH$ - Ethane] is a Alcoholic organic compound
- Molecular Formula :



- (iii) Write chemical reaction of organic compound C and D with concentrated sulphuric acid.

$$CH_3COOH + C_2H_5OH \xrightarrow[H_2SO_4]{\text{Conc.}} CH_3COOC_2H_5 + H_2O$$

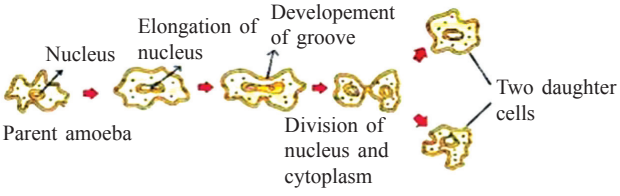
compound-D ethanoic acid | compound-C ethanol | ethanoic acetate (ester) | water

(iv) Write two uses of the compound gain ed after reaction between C and D

- To prepare perfume.
- Used as flavoring agent.

**50.** Name of asexual reproduction methods are given below.

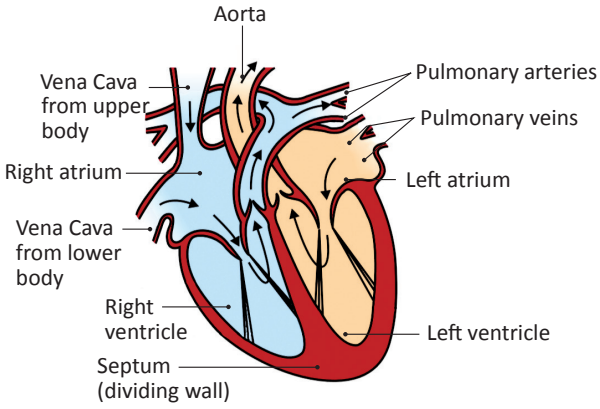
- (i) Fission (ii) Budding (iii) Fragmentation (iv) Regeneration (v) Spore formation (vi) Vegetative propagation (vii) Propagation by tissue culture.
- For unicellular organisms, cell division, or fission, leads to the creation of new individuals. Many different patterns of fission have been observed. Many bacteria and protozoa simply split into two equal halves during cell division. In organisms such as amoeba, the splitting of the two cells during division can take place in any plane.
- The single-celled organisms, such as the malaria parasite, plasmodium, divide into many daughter cells simultaneously by multiple fission. Yeast, on the other hand, can put out small buds that separate and grow further.
- **Binary Fission in Amoeba :**




**Binary fission in Amoeba**

- Amoeba is a unicellular organism and just like bacteria, it reproduces through binary fission. After replicating its genetic material through mitotic division, the cell divides into two equal-sized daughter cells. In this method, two similar individuals are produced from a single parent cell.

**51.**




*Schematic sectional view of the human heart*

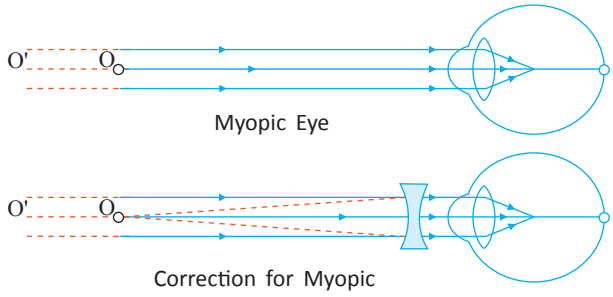
- **Entry of oxygen in the blood through lungs:**
- Deoxygenated blood from various organs of the body is received by the right atrium through the superior and inferior vena cava.
- At the same time left atrium receives oxygenated blood from the lung through the pulmonary veins.
- Now both the atria contract and the deoxygenated blood from right atrium is poured into right ventricle and oxygenated blood from left atrium is poured into left ventricle.
- Now both the ventricles contract. Due to contraction of right ventricle, the blood enters into lungs through arteries.
- In lungs $CO_2$ is released from blood and $O_2$ diffuses into it. While due to contraction of left ventricle, oxygenated blood is distributed to all the parts of the body through the aorta.
- The separation of both types of the blood in the heart allows a highly efficient supply of oxygen to the body.
- This is useful in the animals which have high energy need, such as birds and mammals, which constantly use energy to maintain their body temperature.

**52.** The child is suffering from myopia.

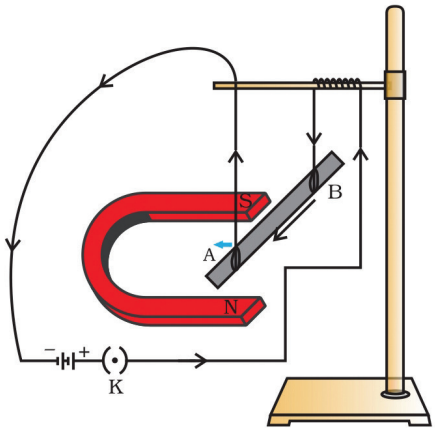
- This defect may arise due to

  (i) Excessive curvature of the eye-lens

  (ii) Elongation of eye-ball
- This defect can be corrected by using a concave lens of suitable power.
- A concave lens of suitable power will bring the image back on to the retina and thus the defect is corrected.



**53.**




- **Procedure :**
- Take a small aluminum rod AB (of about 5 cm). Using two connecting wires suspend it horizontally from a stand, as shown in Fig.
- Place a strong horse-shoe magnet in such a way that the rod lies between the two poles with the magnetic field directed upwards. For this put the north pole of the magnet vertically below and south pole vertically above the aluminum for (Fig.)
- Connect the aluminum rod in series with a battery, a key and a rheostat.
- Now pass a current through the aluminium rod from end B and end A.
- **Observation :**
- It is observed that the rod is displaced towards the left.
- Reversing the direction of current flowing through the rod, it is now displaced towards the right.
- **Conclusion :**
- The displacement of the rod suggest that a force is exerted on the current carrying aluminium rod when it is placed in a magnetic field.

**54.**

- Ozone is formed due to action of UV rays on oxygen molecules to form free oxygen atom which subsequently combines with another molecule of oxygen to form ozone. The reaction is :

$$O_2 \xrightarrow{UV} O + O$$

$$O + O_2 \longrightarrow O_3$$

(Ozone)

- Ozone depletion is a cause of concern because it protects us from the harmful ultraviolet radiations of the Sun by absorbing them. The UV rays can cause skin cancer, ageing, cataract, etc. to human beings if they are not absorbed by ozone due to ozone depletion.
- The main responsible compounds in ozone depletion are chlorofluorocarbons (CFCs)
- Chloroflurocarbons (CFCs) are used in refrigerators as well as fire-extinguishers.