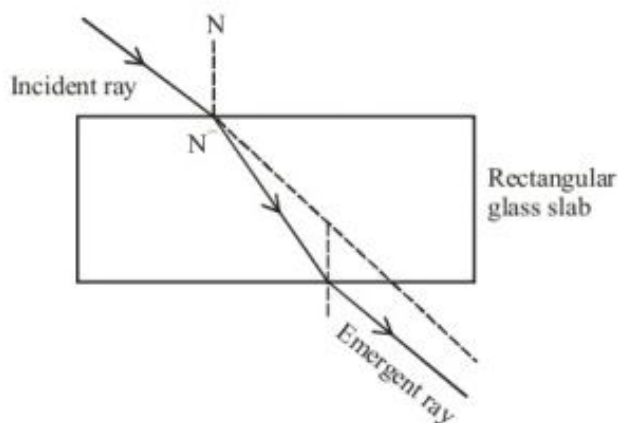


**SAMPLE PAPER-3**

1. (d) Ovule is a small egg cell which is present in the female reproductive part called gynoecium, that ultimately becomes fruit. (1 mark)
2. (d) Variation is any difference between cells, individual organisms, or groups of organisms of any species caused either by genetic differences (genotypic variation) or by the effect of environmental factors on the expression of the genetic potentials (phenotypic variation). It can be brought about by sexual reproduction, copying of DNA and adjusting with environment. (1 mark)
3. (c) The value of x and y are 4 and 2 respectively (1 mark)  

$$\text{Cu} + 4\text{HNO}_3 \longrightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{NO}_2 + 2\text{H}_2\text{O}$$
4. (a) Because solid compounds do not show chemical reaction. (1 mark)
5. (a) The ratio of the sine of the angle of incidence and refraction is constant for all incidences in any given pair of media for electromagnetic waves of a definite frequency. (1 mark)  

$$\frac{\sin i}{\sin r} = \mu_2$$
6. (c) Refraction, dispersion and internal reflection of light are involved in the formation of a rainbow. A rainbow is a natural spectrum of sunlight in the form of bows appearing in the sky when the sun shines on rain drops. It is combined result of reflection, refraction and dispersion of sunlight from water droplets, in atmosphere. Always it formed in the direction opposite to the Sun. (1 mark)
7. (b) The chipko movement or chipko andolan was to save trees or conservation of forests in India where people prevent trees from being cut down. In chipko movement, the trees were saved by the women of the village. (1 mark)
8. (d) Through recycling, reusing and reducing we can minimise the use of natural resources. (1 mark)
9. (c) (1 mark)



Emergent ray is parallel to the incident ray.

10. (a) As ray of light passing from air to water *i.e.*, rarer to denser medium hence bends towards normal. Hence angle between normal and refracted ray < angle between normal and incident ray *i.e.*,  $25^\circ$ . (1 mark)
11. Convex mirror always forms virtual, erect and diminished image of objects hence covers larger area. (1 mark)

12. Magnification,  $M = -v/u$  (real)

$$-3 = \frac{-v}{u}$$

$$v = 3u, u = -10 \text{ cm (given)}$$

$$\text{So, } v = (-3) \times (-10)$$

$$\boxed{v = -30 \text{ cm}} \text{ i.e., 30 cm from the mirror.} \quad (1 \text{ mark})$$

13. The element 'X' is copper and the black coloured compound formed will be CuO (cuprous oxide). (1 mark)



**OR**

When the oil and fat containing food is surrounded by unreactive gas nitrogen, there is no oxygen to cause its oxidation and make it rancid. (1 mark)

14. Life processes like nutrition, respiration, transportation, excretion are essential for maintaining life. (1 mark)

**OR**

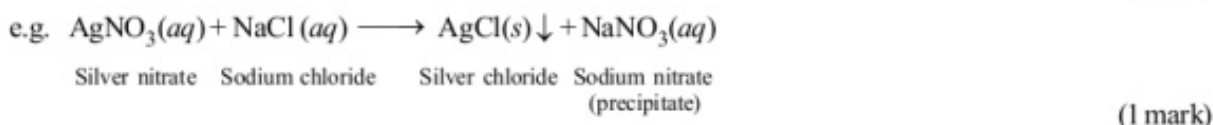
The reaction involved will be given as:



15. We use the following criteria to decide whether something is alive or not :

- (a) Movement
- (b) Need of food, air and water
- (c) Growth
- (d) Response to changes around them
- (e) Respiration
- (f) Excretion
- (g) Reproduction (1 mark)

16. Those reactions which produce an insoluble product or precipitate are known as precipitation reaction. (1 mark)



**OR**



17. Cerebellum, a part of hind brain, maintains the posture and equilibrium of the body. (1 mark)

18. (d) The bulbs are usually filled with chemically inactive gases. Nitrogen and oxygen gases are inactive and are filled in order to prolong the life of the filament. Thus, in this case, assertion is incorrect but the reason is correct. (1 mark)

19. (a) Cerebrum is the largest part of the brain and is composed of right and left hemispheres. It performs higher functions like interpreting touch, vision and hearing, as well as speech, reasoning, emotions, learning, and fine control of movement. (1 mark)

20. (a) Silver is the best conductor of electricity because it contains a higher number of movable atoms (free electrons). (1 mark)

$$\text{Resistivity} = \frac{1}{\text{Conductivity}}$$

21. The factors on which resistance of a conductor depends are:  
 (a) Length of conductor : It is directly proportional to the length of conductor.  
 (b) Area of cross-section : It is inversely proportional to the area of cross-section.  
 (c) Nature of a material.  
 (d) Temperature of the conductor. (3 marks)
22. Biogas obtained from biomass is used as a fuel in rural areas whereas the waste left after obtaining biogas is rich in nitrogen and phosphorous, so it is used as manure by farmers. The biogas used does not leave any residue and neither produces any smoke. (3 marks)
23. (a)  $\text{KOH} + \text{HCl} \longrightarrow \text{KCl} + \text{H}_2\text{O}$   
 (b)  $2\text{Al}(\text{OH})_3 + 3\text{H}_2\text{SO}_4 \longrightarrow \text{Al}_2(\text{SO}_4)_3 + 6\text{H}_2\text{O}$   
 (c)  $2\text{KOH} + \text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$  (1 × 3 = 3 marks)

OR

- (a) Baking soda is sodium hydrogencarbonate. On heating, it is converted into sodium carbonate which is bitter to taste.  

$$2\text{NaHCO}_3 \xrightarrow{\text{Heat}} \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$$
- (b) Baking soda can be converted into baking powder by the addition of appropriate amount of tartaric acid to it.  
 (c) The role of tartaric acid is to neutralise sodium carbonate and cake will not taste bitter. (1 × 3 = 3 marks)
24. When an atoms gains one or more electrons, an anion is formed. Due to this one or more electron is added to the valence shell of the atom but the nuclear charge remains the same. An increase in the number of electrons in the valence shell reduces the effective nuclear charge due to greater mutual shielding by the electrons. As a result, electrons cloud expands, *i.e.*, the ionic radius increases. (3 marks)
25. A majority of aquatic animals like fish and prawns breathe through special organs called gills. Gills are projections of the skin that help in using oxygen dissolved in water. Gills contain blood vessels which help in exchange of gases. To get oxygen dissolved in water, fish gulp water through the mouth and pump it over the gills. Water passes into the gill chamber through gill slits. In each chamber, the water passes over the filaments. They absorb oxygen from the water and replace it with carbon dioxide formed. The water then passes out through the gill opening and this process is repeated again and again.

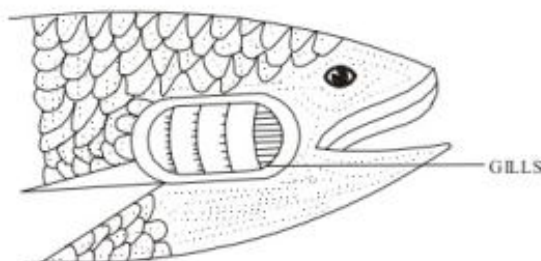


Fig.: Gills of fish

(3 marks)



OR

Liver is largest gland in the human body. It secretes an alkaline fluid called bile which is stored in gall bladder.

**Function of liver :**

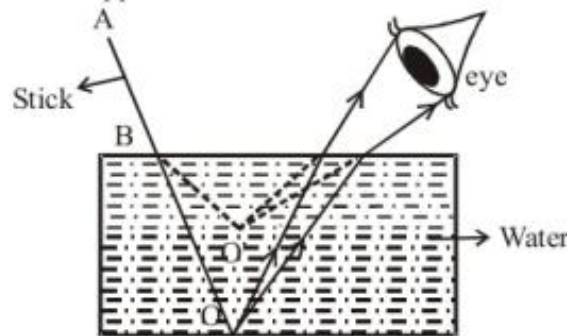
- (a) It causes emulsification of fats *i.e.* breaks fats into small globules.
- (b) It produces alkaline medium for digestion of food in the intestine as the food is acidic in nature due to HCl in the stomach. (3 marks)

26. The seminal vesicles are a pair of simple tubular glands located within the pelvis in human male. It secretes a viscous fluid for the nourishment of sperms in human male.

The prostate gland located between the bladder and the penis in human male. It secretes prostate fluid one of the component of semen which neutralises the acidity caused due to residual urine. (3 marks)

27. A stick partially immersed in water appears to be bent due to refraction of light. When a ray of light travels from water to air (*i.e.* denser to rarer medium) from the point O, then it bends away from the normal. On extending these refracted rays on other sides, the rays appear to meet at O'.

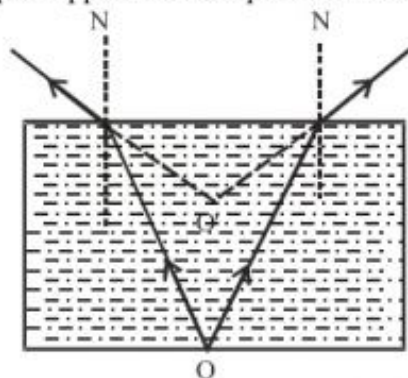
The actual stick which is ABO appears to be as ABO'.



(3 marks)

OR

A pool of water appears to be less deeper than actually it is due to refraction of light. When a ray of light travels from water to air (*i.e.* from denser to rarer medium) from the depth of the pool, it appears to bend away from normal. On extending these rays on other side they appear to meet at O', which is the apparent depth of the pool and pool appears less deeper than it actually is.



(3 marks)

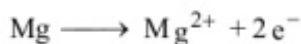
28. Distilled water does not conduct electricity because it does not contain any ionic compound like acids, bases or salts, dissolved in it. Rain water, while falling to the earth through the atmosphere, dissolves acidic gases like CO<sub>2</sub>, SO<sub>2</sub> etc., from the air thus forms acids like carbonic acid (H<sub>2</sub>CO<sub>3</sub>), sulphurous acid (H<sub>2</sub>SO<sub>3</sub>) etc. These acids provides hydrogen ions (H<sup>+</sup>) to rain water. So, due to presence of these acids or ions, the rain water conducts electricity. (3 marks)

29. The electrical changes of heart can be recorded by an instrument called as electrocardiograph. This graphic recording of heart is called as ECG or electrocardiogram. Therefore, to detect any heart problem an ECG is done and the graph helps to find out the area of malfunction. In this way, the patient can be treated accordingly. (3 marks)
30. (a) AIDS can be diagnosed by a test ELISA.  
 (b) AIDS can be caused by :  
 1. Blood transfusion from an infected person  
 2. Use of infected syringes and needles  
 3. From an infected mother to an unborn child  
 4. Sexual contact with an infected person (1½ × 2 = 3 marks)
31. The factors on which strength of magnetic field depends:  
 (a) **Around a straight current carrying conductor**  
 (i) Current *i.e.* it is directly proportional to the current flowing through the conductor.  
 (ii) Distance from the wire : Strength of magnetic field is inversely proportional to the distance from the wire carrying current.  
 (b) **Around a circular coil carrying current**  
 (i) Current *i.e.*, it is directly proportional to the current flowing through the conductor.  
 (ii) Radius of coil, it is inversely proportional to the radius of coil. (2½ × 2 = 5 marks)
32. **Advantages**  
 (a) It is very cheap.  
 (b) It is readily available and is widely used in metallurgy.  
**Disadvantages**  
 (a) It cannot be used for the reduction of metals which are very high in the activity series of metals like Na, K, Ca, Mg, Al, because these metals have more affinity for oxygen than carbon therefore carbon is unable to remove oxygen from these metal oxides and hence cannot convert them into free metals.  
 (b) Some traces of carbon left in the metals act as an impurity when we use carbon as a reducing agent. (2½ × 2 = 5 marks)

OR

Metals are found in nature in the form of ores or minerals. (1 mark)

**Reaction with oxygen :** When a metal combines with oxygen, it loses its valence electrons and forms positively charged metal ions (oxidation of metal). The atoms of oxygen accept the electrons lost by the metal and form negative oxide ions.



**Reaction with dil. acids:** The metal replaces the hydrogen atom in the acid to form a salt.



33. **Hormones:** Hormones are non-nutrient chemicals which act as intercellular messengers and are produced in trace amounts. These are released from endocrine glands (ductless glands) and their timing and amount of release are regulated by feedback mechanisms. (1 mark)

The hormones show following characteristic:

- (a) They are produced at a place other than the site of action and are secreted directly into blood stream.
- (b) They act on specific tissues or target organs.
- (c) They are secreted in response to changes in the external or internal environment of the body and also called as chemical messengers.
- (d) They may stimulate or inhibit the activity of the target organ, thus regulating its activity and its excess or deficiency may lead to serious consequences or diseases. (2 marks)

Some of the examples of hormones are:

- (a) Adrenaline: Secreted from adrenal gland which prepare the body for fight & flight situation.
- (b) Insulin: Produced by pancreas, regulates the blood sugar level in the body.
- (c) Sex hormones: Testosterone in males, progesterone in females.
- (d) Thyroxin: Secreted from thyroid gland and regulates carbohydrate, fat and protein metabolism so as to provide the best balance for growth. (2 marks)

34. (a) Here,  $P = -0.6 D$ .

We know that,  $P = \frac{1}{\text{Focal length (in m)}}$

$$\Rightarrow \text{Focal length} = \frac{1}{P} = \frac{1}{-0.6} = \frac{10}{6} = -1.66 \text{ m}$$

So the far point of the eye will be  $-1.66 \text{ m}$

(2½ marks)

- (b) Here,  $P = +0.8 D$

$$u = -25 \text{ cm} = -\frac{25}{100} \text{ m} = -\frac{1}{4} \text{ m}$$

$$v = ?$$

According to lens formula,

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\text{or, } P = \frac{1}{v} - \frac{1}{u} \quad \left( \because P = \frac{1}{f} \right)$$

$$\text{or, } P = \frac{1}{v} - \frac{1}{\left(-\frac{1}{4}\right)} \quad \text{or, } \frac{1}{v} = P - 4$$

$$\text{or, } \frac{1}{v} = 0.8 - 4 \quad \text{or, } \frac{1}{v} = -3.2$$

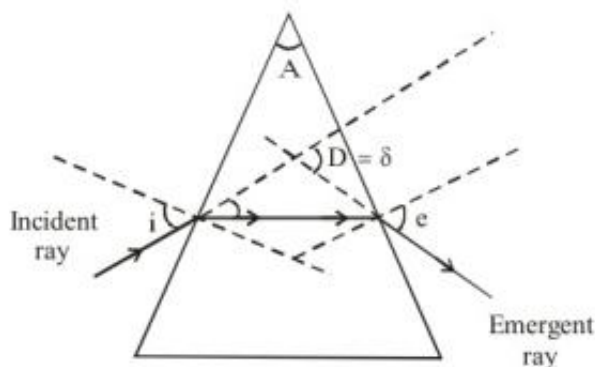
$$\Rightarrow v = -\frac{1}{3.2} \text{ m} = -\frac{10}{32} \text{ m} = -0.31 \text{ m}$$

Therefore, near point of the eye is  $0.31 \text{ m} = 31 \text{ cm}$

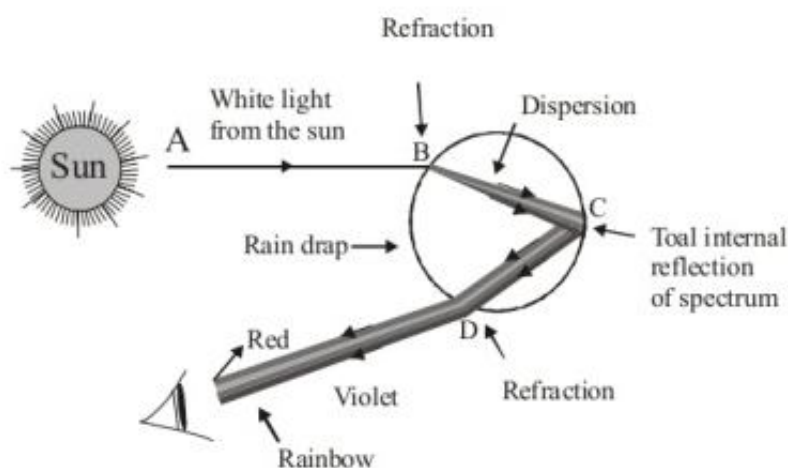
(2½ marks)

**OR**

- (a) The angle between the emergent ray and incident ray is called angle of deviation. The peculiar shape of the prism makes the emergent ray bends at an angle to the direction of the incident ray as shown in the given diagram. This angle is called the angle of deviation ( $\delta$ ).

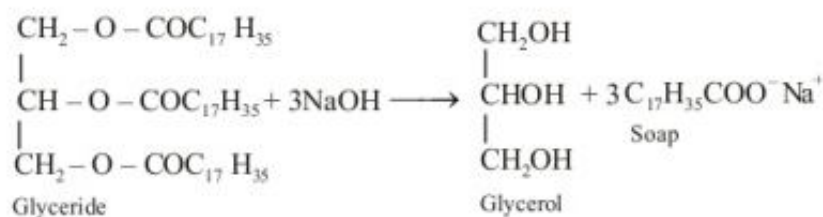


- (b) When a beam of light enters a prism, it gets refracted and splits into its seven constituent colours VIBGYOR. This splitting of the light ray occurs because light of different colours having different wavelengths has different velocities while travelling in medium *i.e.*, the different angles of bending for each colour. Hence, each colour passing through the prism bends at different angles with the respect to the incident beam. The band of coloured components of light beam is called **its spectrum**.
- (c) Labelled ray diagram to show the formation of a rainbow.



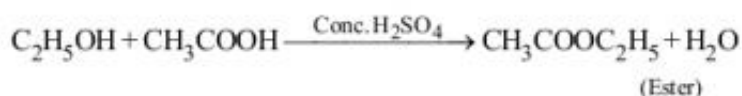
(5 marks)

35. (a) **Saponification reaction** – It is the reaction between an alkali solution and ester which results into formation of constituent alcohol and sodium salt of the acid.



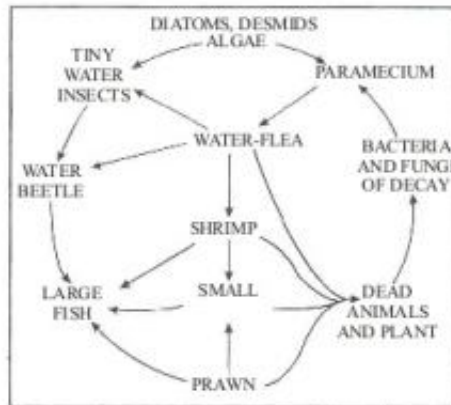
(2½ marks)

- (b) **Esterification** – It is the reaction of an alcohol with carboxylic acid in presence of conc.  $\text{H}_2\text{SO}_4$  to form ester and water.



(2½ marks)

36. In nature, the food chains are not strictly linear, but are inter-related and interconnected with one another. Generally, the various food chains in a community are interlinked so as to form a sort of web. With the result, one animal may be linked in more than one food chain. A network of food chains in a community is referred to as a food web. A food web may have all or some of the three types of food chains i.e. detritus, predator and parasitic. The food webs become more complicated because of variability of taste and preference, availability and compulsion and several other factors at each level. For example, tigers normally do not eat fish or crab, but they are forced to feed on them in the Sunderbans.



(5 marks)

**OR**

**Fundamental trophic levels are :**

- (a) The plants are producers or autotrophs and constitute the “first trophic level”. They fix up the Sun’s energy and make it available for consumers (or heterotrophs).
- (b) Herbivores which feed upon plants constitute the “second trophic level”.
- (c) Carnivores that feed upon herbivores constitute the “third trophic level”.
- (d) Large carnivores or top carnivores which feed upon small carnivores, constitute the “fourth trophic level”.

Herbivores are called primary consumers, small carnivores are called secondary consumers whereas top carnivores and large carnivores are called tertiary consumers. (5 marks)