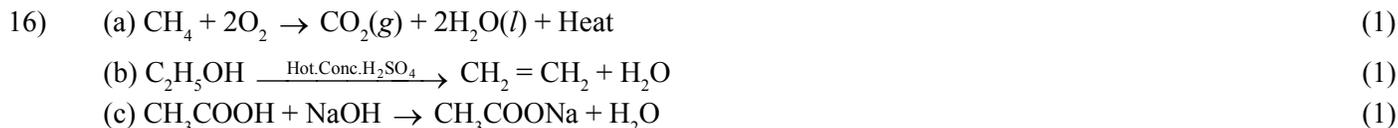
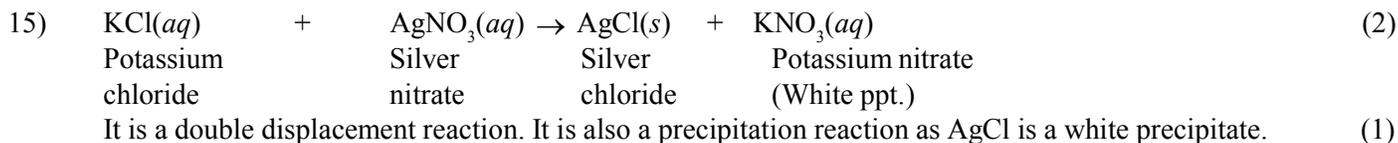


**Section - A**

- 1) 0.02%, 0.03% (1)
- 2) Boron, Silicon and Germanium. (1)
- 3) (a) Round Yellow (b) Round Yellow, Round green Wrinkled yellow, Wrinkled green (1+1)  
 (c) Wrinkled green (d) Round Yellow (1+1)
- 4) (a) (i) Solar energy (1)  
 (b) Solar cooker, solar cell **OR** UV rays. (1)  
 (c) Global warming, UV rays causing cancers (1)  
 (d) (ii) Rainwater harvesting (1)
- 5) (a) 6 W. As we know,  $P = V \times I = 12 \times 0.5 = 6 \text{ W}$  (1)  
**OR**  
 (d) 6000 J.  $P = \frac{\text{Work done}}{\text{Time}} = \frac{\text{Energy spent}}{\text{Time}}$   $\therefore \text{Energy} = P \times t = 100 \times 60 = 6000 \text{ J}$  (1)
- 6) (b) Resistance. On increasing the length of conducting wire by stretching, its resistance increase while resistivity, volume and density remains constant. (1)
- 7) (b) Use of fuse. The most important safety method used for protecting home appliances from short circuiting or overloading is the use of electric fuse. This is a safety device having thin wire of short length made of tin (25%) and lead (75%) alloy having low melting point around 200°C. (1)
- 8) (b) Callus (1)
- 9) (d) Sal. Arabari forests of Bengal is dominated by sal trees with the active and willing participation of the local community. These forests underwent a remarkable recovery by 1983. (1)  
**OR**  
 (b) hold water and prevent soil erosion.  
 It is important to make small check dams across the flooded gullies because they recharge ground water. These small dams help to hold water. This provides moisture for the vegetation cover thus, preventing soil erosion. (1)
- 10) (a) 7. pH of H<sub>2</sub>O is 7 because it is neutral. (1)
- 11) (b) (ii) and (iii). (1)
- 12) (c) Group 18 (1)  
**OR**  
 (b) Cl (17), 2,8,7 belongs to group 17 and 3rd period. (1)
- 13) (c) Assertion is true but Reason is false. (1)
- 14) (d) Assertion is false but Reason is true. In myopia a person can see nearby objects clearly but cannot see distant objects clearly. Myopia can be corrected by using concave lens. Hence, Assertion is false but Reason is true. (1)

[2]  
**Section - B**



**OR**

- (a) (2, 8, 2) (b) 2 (c) 3 ( $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ )  
 (d)  $\text{H} > \text{G} > \text{F} > \text{E}$  (e) Metal (f) B ( $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ )

- 17) (a) An indicator which is mixture of indicators and which shows a gradual change in colour over a very wide range of  $\text{H}^+$  ions concentration. (1)  
 (b)  $2\text{NaCl}(aq) + 2\text{H}_2\text{O}(l) \xrightarrow{\text{Electrolysis}} 2\text{NaOH}(aq) + \text{H}_2(g) + \text{Cl}_2(g)$ . It is called chlor-alkali process. (1)  
 (c) (i) Because tap water contains salts in ionised forms. ( $\frac{1}{2}$ )  
 (ii) Because  $\text{H}^+$  ions are present in dilute HCl which provides it acidic property. ( $\frac{1}{2}$ )

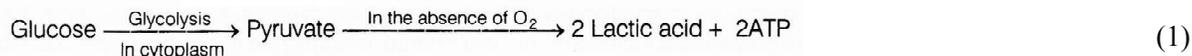
- 18) (a) Transpiration helps in the functioning of plants in the following ways  
 (i) It helps in the ascent of sap through xylem. (1)  
 (ii) It helps in the removal of excess water. (1)  
 (iii) It helps in the regulation of temperature in plant.  
 (b) A vaseline coated leaf does not remain healthy as this coating blocks the stomata of the leaf. Due to this, the leaf is unable to carry out gaseous exchange to perform photosynthesis and respiration. Further, it would also not be able to carry out transpiration. (1)

**OR**

- (a) Anaerobic respiration takes place in the absence of oxygen. In an yeast cell, the end products formed during fermentation (anaerobic respiration) are ethyl alcohol, carbon dioxide and energy. It can be summarised by the given equation



However in human muscles, the end products of anaerobic respiration are lactic acid and energy. It can be summarised by the given equation



- (b) In humans, anaerobic respiration occurs after vigorous exercise to satisfy the body's increased energy demand. Accumulation of lactic acid in muscles produced during this respiration causes muscular cramps in the body. (1)

- 19) (a)

Endocrine System	Nervous System
i) The action of endocrine system is often very diverse, affecting many cell and sometimes several organs found in different parts of the body.	i) The action of nervous system is limited to a few muscle fibres or gland cells of an organ or organ system.
ii) The system is not directly connected to organs or tissues under its control.	ii) The system is directly connected to tissues or organs under its control.
iii) It exerts its control through hormones or chemical regulators poured into circulatory system.	iii) Nervous system exerts its control through chemical stimulants poured directly over the tissues or organs.
iv) The information is transmitted slowly.	iv) The information is transmitted almost instantaneously.

( $\frac{1}{2} + \frac{1}{2}$ )  
 ( $\frac{1}{2} + \frac{1}{2}$ )

- (b) Forebrain. (1/2)  
**Functions :-** (i) The main thinking part of the brain.  
(ii) It has regions which receive the sensory impulses from various receptors. The areas for smell, hearing, vision, etc are separate.  
(iii) It also posses the site of memory and intelligence.  
(iv) Hunger centers. (1/2)

- 20) The series of organisms that take part at various biotic levels form a food chain. (1)  
At each trophic level in a food chain, a large portion of the energy is utilised for the maintenance of organisms which occur at that trophic level and energy is lost as heat. As a result of this, organisms in each trophic level pass on less energy to the next trophic levels, than they receive. The longer the food chain, the less is the energy available to the final member of the food chain, which will be insufficient for their survival. (2)

- 21) (a) To provide oxygen and nutrition to the foetus from mother's blood and to remove CO<sub>2</sub> and nitrogenous wastes from the blood of foetus. (1)  
(b) Vasectomy in males, Tubectomy in females. (1)  
(c) Gonorrhoea, Syphilis, Genital Herpes, Genital Warts, AIDS. (1)

- 22) The equivalent resistance of the resistors  $R_1$  and  $R_2$  in parallel between  $A$  and  $C$  is

$$\frac{1}{R_{AC}} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{2} + \frac{1}{2} = \frac{2}{2} = 1 \quad (1/2)$$

$$\therefore R_{AC} = 1\Omega$$

Similarly, between  $B$  and  $C$ ,

$$\frac{1}{R_{BC}} = \frac{1}{R_3} + \frac{1}{R_4} = \frac{1}{2} + \frac{1}{2} = 1 \quad (1/2)$$

$$\therefore R_{BC} = 1\Omega$$

Now,  $R_{AC}$  and  $R_{BC}$  are joined in series

$$R' = R_{AC} + R_{BC} = 1 + 1 = 2\Omega \quad (1/2)$$

Parallel combination of  $R_8$  and  $R_7$  between  $A$  and  $D$  gives

$$R_{AD} = 1\Omega \quad (1/2)$$

Parallel combination of  $R_5$  and  $R_6$  between  $D$  and  $B$  gives

$$R_{DB} = 1\Omega \quad (1/2)$$

The equivalent resistance of series combination of  $R_{AD}$  and  $R_{DB}$  is

$$R'' = R_{AD} + R_{DB} = 1 + 1 = 2\Omega$$

$R'$  and  $R''$  are connected in parallel.

The equivalent resistance is

$$\frac{1}{R_{eq}} = \frac{1}{R'} + \frac{1}{R''} = \frac{1}{2} + \frac{1}{2} = 1$$

$$\therefore R_{eq} = 1\Omega \quad (1/2)$$

- 23) **Overloading :** If the current drawn by the many electrical appliances connected to a single socket exceeds the current rating of the wire, the entire circuit or part of circuit gets heated and can even cause fire. This is known as overloading. It might be due to (1)  
(a) accidental hike in supplied voltage or (1/2)  
(b) connecting too many appliances to a single socket or (1/2)  
(c) damage in the insulation of wires or (1/2)  
(d) some fault in the appliances or (1/2)  
(e) direct contact between a live wire and a neutral wire.

- 24) Given,  $P_1 = 5D \Rightarrow f_1 = \frac{100}{P_1} \text{cm} = \frac{100}{5} \text{cm} = 20\text{cm}$  (1/2)

$$P_1 = -4D \Rightarrow f_2 = \frac{100}{P_2} \text{cm} = \frac{100}{-4} \text{cm} = -25\text{cm} \quad (1/2)$$

If  $F$  be the focal length of combination of both lenses, then

$$\frac{1}{F} = \frac{1}{f_1} + \frac{1}{f_2} = \frac{1}{20} - \frac{1}{25} = \frac{5-4}{100} \Rightarrow \frac{1}{F} = \frac{1}{100} \quad (1)$$

$\therefore F = 100$  cm

Power of combination of both lenses.

$$P = \frac{1}{F(\text{in metre})} = \frac{100}{F(\text{cm})} \quad (1)$$

$$P = \frac{100}{100} = 1D \quad (1)$$

**OR**

Given,  $u = -50$  cm,  $v = -30$  cm

By mirror formula,  $\frac{1}{f} = \frac{1}{v} + \frac{1}{u} \quad (1)$

$$\frac{1}{f} = \frac{1}{-30} + \frac{1}{(-50)} = -\left[\frac{5+3}{150}\right] = \frac{-8}{150}$$

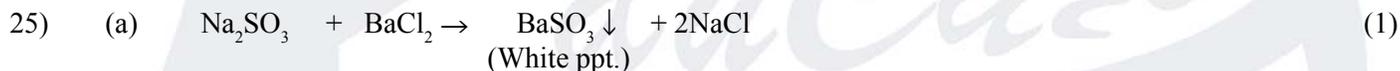
$$f = -18.75 \text{ cm} \quad (1)$$

Magnification of the mirror,

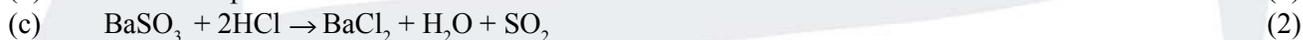
$$m = \frac{f-v}{f} = \frac{-18.75 - (-30)}{-18.75}$$

$$m = \frac{-11.25}{18.75} = -0.6 \quad (1)$$

### Section - C



(b) Double displacement (1)



As  $\text{BaSO}_3$  is decomposed by  $\text{HCl}$  to give  $\text{BaCl}_2$ , water and a gas.  $\text{BaCl}_2$  is soluble in water, so we get clear solution.

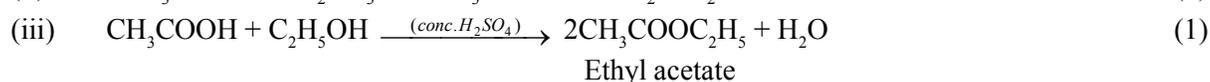
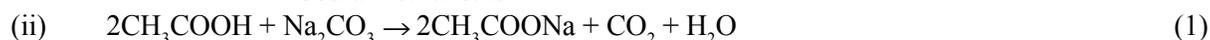
(d)  $\text{BaSO}_3$ . Barium sulphide (1)

**OR**

(a) B will displace copper from copper sulphate solution because it is more reactive than copper. Reddish brown copper metal will get deposited and the blue colour of solution will change. (2)

(b) Container of metal D could be used for storing zinc sulphate and silver nitrate solution because 'D' is least reactive. (1)

(c) Zinc sulphate solution can be stored easily in a container made up of any of these metals because these metals are less reactive than zinc. (2)



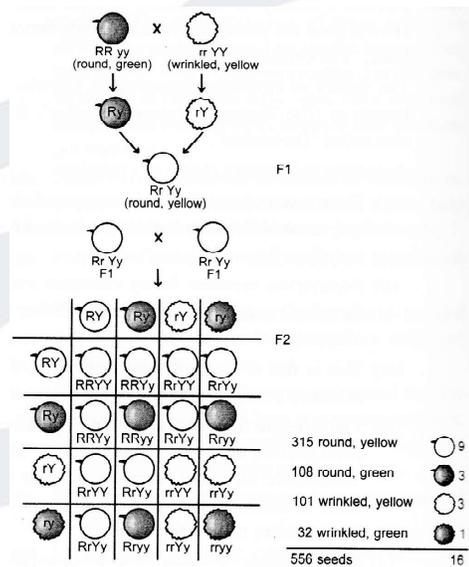
(b) Concentrated sulphuric acid is used as a catalyst (dehydrating agent) to remove water from the products side when ethanoic acid reacts with alcohol to form pleasant smelling esters. This reaction is also called esterification. (1)

(c) It is used for making vinegar. (1)

- 27) (a) A colourless liquid which is involved in transportation is lymph. It contains proteins, WBCs and flows from organs towards heart. (2)
- (b) Killing of pathogens, drains excess fluid from extracellular space back into the blood. Transports digested absorbed fat. (1)

	Arteries	Veins	Capillaries	
(c)	[a] Arteries carry oxygenated blood from heart to various organs of the body.	Veins carry deoxygenated blood from various organs to heart.	Exchanges of materials between blood and surrounding cells take place in the capillaries.	(2)
	[b] They are thick walled.	They are thin walled.	They are thin walled and extremely narrow tubes or blood vessels which connect arteries to veins.	

- 28) (a) **Mendel's Experiments on Inheritance of Traits :-** Mendel used a number of visible contrasting characters of garden pea like round/wrinkled seeds, tall/short plants, white/violet flowers, etc. (3)



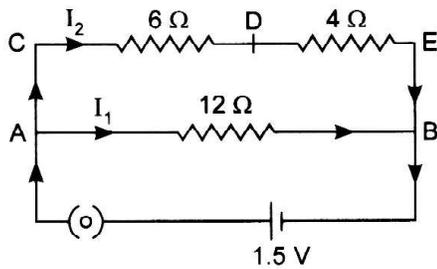
- (i) **Traits may be dominant or recessive:-**
- Only one of the parental traits appeared in the  $F_1$  generation; it is called dominant trait and the trait which remains hidden, is called recessive trait. (1/2)
  - When the  $F_1$  plants were self-pollinated, the  $F_2$  progeny consists of plants with the dominant trait and recessive trait in the ratio of 3 : 1; it proves that traits may be dominant or recessive. (1/2)
- (ii) **Traits are inherited independently :-**
- There were also some new combinations like tall plants with wrinkled seeds and short plants with round seeds. (1/2)
  - Thus it is clear that the tall and short traits and round and wrinkled seed traits are inherited independently of each other. (1/2)

**OR**

- (a) Genes are the units of heredity. Each gene exercise its function by synthesizing specific protein which is responsible for the expression of characteristic. (1)
- For example, consider the height as a characteristic of the plant. We know that plants have hormones that can trigger growth. So, height of plants depend upon the amount of particular hormone by making enzyme. However, if the gene has alternation that makes the enzyme less efficient, the amount of the hormone will be less and plant will be dwarf. This clearly indicates that characteristics are under the control of genes. (1)

- (b) Traits which can be passed on to progeny are: (i) Hair type and colour. (ii) Red colour of beetles. Traits which cannot be passed on to progeny are : (iii) The cut tail of a mouse. (iv) Preference for certain types of food. (1)
- (c) It refers to a population of organism consisting of similar individuals which can breed together and produce fertile offsprings. Two examples of plants species are rose and lily. (2)  
Two examples of animals species are lion and elephant.

29)



Let  $I_1$  and  $I_2$  be current flowing through  $AB$ ,  $AC$  and  $CDE$  respectively. Resistances in the arm  $CDE$  are connected in series, whereas the arms  $CDE$  and  $AB$  are connected in parallels.

Voltage across two arms is same and is equal to 1.5 V.

(a) Current in arm  $AB = \frac{V}{R} = \frac{1.5}{12} = 0.125 A$  (1)

Current in arm  $CDE = \frac{V}{R} = \frac{1.5}{(6+4)} = \frac{1.5}{10} = 0.15 A$  (1)

Current in arm  $AC =$  Current in arm  $CDE = 0.15 A$

(b) Potential difference across  $AB = 1.5 V$   
Potential difference across  $CD = I \times R = 0.15 A \times 6\Omega = 0.9 V$  (1)

Potential difference across  $DE = I \times R = 0.15 A \times 4\Omega = 0.6 V$  (1)

(c) Effective resistance of circuit

$$R_1 = 6\Omega, R_2 = 4\Omega, R_3 = 12\Omega$$

$$R_s = R_1 + R_2 = 6 + 4 = 10\Omega, R_3 = 12$$

$$\frac{1}{R} = \frac{1}{R_s} + \frac{1}{R_3} = \frac{1}{10} + \frac{1}{12} = \frac{6+5}{60} = \frac{11}{60}$$

$$R = \frac{60}{11} = 5.4\Omega$$
 (1)

- 30) (a) A sudden flow of very large current due to direct contact of a live and a neutral wire is called short circuiting. (2)
- (b) MCB's (1)
- (c) **Right Hand Thumb Rule :** If thumb, the forefinger and middle finger of right hand are bent at right angles to one another with the thumb pointed in the direction of motion of conductor relative to a magnetic field and forefinger in direction of field, then middle finger will point in direction of induced emf. (2)

~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~