SECTION–A

1. The points are C and M.
2. Mercury (Hg)
3. In doing so he is increasing pH, because the milk will curdle only if pH is below 6.
4. It is because tap water contains many dissolved metallic salts which provided free cations and anions and hence help in conduction of electricity.
5. Given $P = 200\ W$
   $V = 220\ V$

   $$\therefore \quad I = \frac{P}{V} = \frac{2000}{220} = 9.09\ A$$

   A fuse of 10 A is required for safe use of geyser.
6. It is unsaturated compound
7. (i) Hydrogen gas
   (ii) Downward displacement of water
   (iii) Insoluble in water
   (iv) Lighter than air.
8. Both the graphs are correct. In first graph V/I is greater for 'series' and less for 'Parallel'. This correctly shows that the resistance is more in 'series' than in 'parallel'. In the second graph also the same relation holds true.
9. Dot structure of sodium and chlorine.

   $Na^{\cdot}$ $\qquad$ $\cdot\ddot{\underset{\cdot\cdot}{Cl}}:$

   (2, 8, 1) $\qquad$ (2, 8, 7)

   Sodium atom $\qquad$ Chlorine atom

   Formation of sodium chloride:

   the electronic configuration of sodium atom $^{23}_{11}Na$ is (2, 8, 1). It is an electropositive element, which can attain the electronic configuration of nearest noble gas neon [Ne = (2, 8)] by donating (losing) one electron from its valence shell to form sodium ion (Na^+).

   $$Na - e^- \longrightarrow Na^+$$

   [2,8,1] $\qquad$ [2, 8]

   Sodium atom $\qquad$ Sodium ion

   The electronic configuration of chlorine atom $^{35}_{17}Cl$ is (2, 8, 7). It is an electronegative element which can attain the electronic configuration of nearest noble gas argon [Ar = (2, 8)] by accepting (gaining) one electron in tis valence shell to form chloride ion (Cl^-)

   $$Cl + e^- \longrightarrow Cl^-$$

   [2,8,7] $\qquad$ [2, 8, 8]

   Chlorine atom $\qquad$ Chlorine ion

   The positively charged sodium ion attracts negatively charged chloride ion with a stronger electrostatic

force, and hence, binds them with each other and the compound sodium chloride is formed. The bond so formed between sodium and chloride ion is called electrovalent bond

$Na^{\bullet}$	+	$\cdot\ddot{Cl}:$	$\longrightarrow$	$[Na]^+$	$\left[:\ddot{Cl}:\right]^-$ or NaCl
(2,8,1)		(2,8,7)		(2,8)	(2, 8) Sodium
Sodium		Chlorine		Sodium ion	Chlorine ion Chloride
atom		atom		Sodium	Chloride

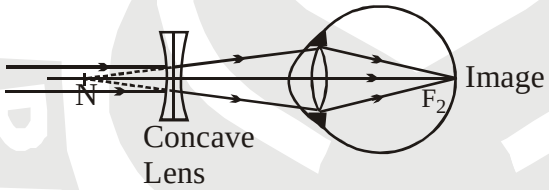
Electrovalent bond is formed.

Sodium chloride has high melting point because a very high temperature is required to break the strong electrostatic forces between sodium and chloride ions.

10. (a) Short-sightedness of hypermetropia.

(b) Concave lens

the concave lens forms a virtual, erect and diminished image of the distant object between 25 cm and 30 cm.



11. (i) Initially the colourless limewater (calcium hydroxide solution) will turn milky on account of the formation of insoluble calcium carbonate.

$$Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 (\downarrow) H_2O$$

(ii) When the passage of carbon dioxide is continued for a longer time, the milkiness disappears and a colourless solution is formed due to the formation of soluble calcium hydrogen carbonate.

$$CaCO_3 + CO_2 + H_2O \longrightarrow Ca(HCO_3)_2$$

12. (a) Incorrect because according to spectrum colours (VIBGYOR), at position 3 is yellow colour and at positions 5 is blue colour and not blue and yellow.

(b) (i) Position 7 corresponds to solution of potassium permanganate.

(ii) Position 1 corresponds to danger signal.

13. (i) $Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$

Reaction will occur: It is because zinc is more active than copper in metal activity series, and hence, displaces copper from copper sulphate solution.

(ii) $Fe(s) + ZnSO_4(aq) \longrightarrow FeSO_4(aq) + Zn(s)$

No reaction will occur: It is because iron is less active than zinc in metal activity series, and hence, does not displace zinc from zinc sulphate solution

(iii) $Zn(s) + FeSO_4(aq) \longrightarrow ZnSO_4(aq) + Fe(s)$

Reaction will occur : It is because zinc is more active than iron in metal activity series, and hence, will displace iron from iron sulphate solution.

14. (a) Element E will form only covalent compounds

(b) D is a metal with valency 2

(c) element B is a non-metal with valency of 3.

(d) D has bigger atomic radius because as one moves horizontally in a period from left to right, there is a consecutive addition of one proton in nucleus and one electron in the valence shell of an element. The electron is always added in the same valence shell in the same period. However, the addition of proton in nucleus increases the positive charge, which consequently pulls the extra nuclear electrons in the outermost shell inward. Thus, the atomic radius decreases with the increase in number of protons as one moves from left to right in a period.

(e) Element C and F belong to inert gases or noble gases category

15. (i) Compound A is acetic acid.

(ii) $CH_3COOH + C_2H_5OH \xrightarrow{conc.H_2SO_4} CH_3COOC_2H_5 + H_2O$

Acetic acid Ethanol Ethyl ethanoate (Sweet smell)

(iii) When ethyl ethanoate is warmed with sodium hydroxide, it forms ethyl alcohol and sodium acetate.

The acetic acid can be recovered from sodium acetate by treating it with dilute HCl.

(iv) The process is saponification.

$CH_3COO\ C_2H_5 + NaOH \longrightarrow CH_3COONa + C_2H_5OH$

Ethyl ethanoate — Sodium hydroxide — Sodium acetate — Ethanol

$CH_3COONa + HCl \longrightarrow CH_3COOH + NaCl$

Ethyl acetate — Acetic acid

(v) Carbon dioxide gas is produced.

$2CH_3COOH + Na_2CO_3 \longrightarrow 2CH_3COONa + H_2O + CO_2$

Sodium carbonate

OR

(a) Carbon forms largest number of compounds because carbon atom has four valence electrons which it can share either with other carbon atoms or the atoms or the atoms of other elements. Furthermore, carbon atom links with other carbon atoms or the atoms of other elements with single, double or triple covalent bonds

(b) When all the four valencies of carbon are fully satisfied by single covalent bonds with other atoms, then the compound so formed is known as saturated carbon compound.

For example, Ethane (C_2H_6)

(c) Unsaturated carbon compounds are more reactive than saturated carbon compounds.

16. (i) In parallel circuit, each appliance can be operated by an independent switch.

(ii) In parallel circuit, each appliance will receive the required amount of current at steady voltage.

Rating of fuse = 5A

Power, P = 1.5 kW = 1500 w

V = 220 V

$\therefore \quad I = \frac{P}{V} = \frac{1500}{220} = 6.8\ A$

Fuse will melt because more current flows through the heater than the fuse rating. To prevent this, a fuse of 7 A rating is required.

OR

(i) The current in case of (A) is direct current (d.c.)
The current in case of (B) is alternating current (a.c.)

(ii) The source of direct current is a dry cell or accumulator.
The source of alternating current is an a.c. dynamo.

(iii) The frequency of current in India is 50 Hz.

$$\text{From the graph : Frequency} = \frac{1}{\text{Time Period}}$$

$$= \frac{1}{0.02\text{s}} = \frac{50}{\text{s}} = 50 \text{ Hz}$$

(iv)

A.C.	D.C.
(a) A.C. changes direction after equal intervals of time (b) The positive and negative polarity of an A.C. is not fixed	(a) D.C. flows always in the same direction (b) The positive and negative polarity of D.C. is fixed

SECTION–B

17. 15 to 18 times per minute.
18. Leaf
19. (i) Human being, cat and horse are originated from a common ancestor
(ii) Homologous organs..
20. In both the test tubes A and B the products of respiration i.e., aerobic respiration will be. Ethyl alcohol, CO_2 and water.
21. (i) Glycogen and starch — carbohydrate
(ii) Chlorophyll and Haemoglobin — Iron
(iii) Gills and lungs — Respiration
(iv) Arteries and veins — Blood

22. PLACENTA : Placenta is an organ in mammals by means of which the embryo is attached to the wall of the uterus.
Function of Placenta:
(i) The developing embryo gets nutrients and oxygen through the placenta from mother.
(ii) The excretory products of the embryo also remove through the placenta.

23. The gases like CO_2 and methane absorbs infrared radiation of the sun and cause heating of the earth. It is known as the greenhouse effect.
Greenhouse gases : CO_2 and methane.

24. Abiotic components – Sunlight and soil
Biotic components – Trees and animals.

25. (i) Cerebral hemisphere (ii) Corpus callosum
(iii) Cerebellum (iv) Medulla oblongata
(v) Pons (vi) Mid-brain

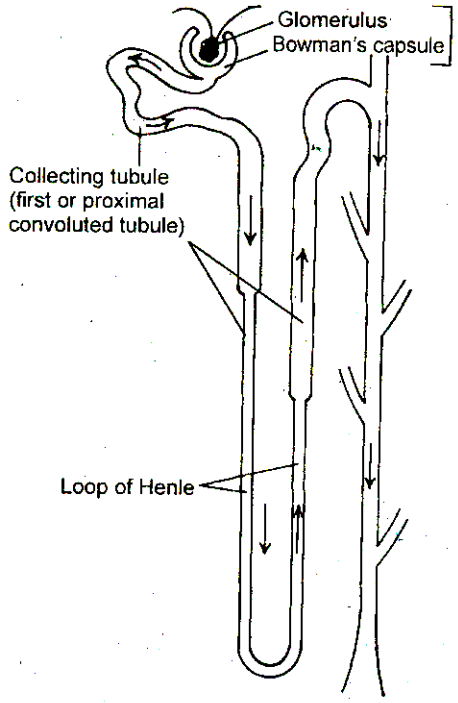
26. (a) The gastric glands release hydrochloric acid of creats an acidic medium facilitates the action of the enzyme pepsin.

(b) The function of digestive enzymes are as follows:

1. **Salivary amylase:** It breaths down starch to give sugar
2. **Pepsin:** It creates an acidic medium in the stomach.
3. **Mucus:** It protects the inner lining of the stomach from the action of acid.
4. **Bile juice:** It acts on facts and break them down into smaller globules.
5. **Trypsin:** It digest proteins and lipase.

27. (a) Osmoregulation: The process of regulating the water and ionic content of the body is called osmoregulation.

(b), (c) Nephron



(a) The picture is showing double fertilization.

(b) Double fertilization : It is process in which two male gamete nuclei separately fuses with different female nuclei. The first male nucleus fuses with the egg cell to form zygote while the second male nucleus fuses with the two polar nuclei to form a triploid nucleus.

(c) Labelling:

(1) Sperm nucleus (2) Egg

(3) Polar nuclei (4) Pollen tube