SAMPLE PAPER

TIME : 3 HRS.   **MAX. MARKS : 80**

GENERAL INSTRUCTIONS :

1. **The question paper comprises four Sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.**

2. **Section A: Qns. 1 to 20 all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion-reason type questions. Answers to these should be given in one word or one sentence.**

3. **Section B: Qns. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.**

4. **Section C: Qns. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.**

5. **Section D: Qns. 34 to 36 are long answer type question carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.**

6. **There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions**

7. **Wherever necessary, neat and properly labelled diagrams should be drawn.**

SECTION-A

1. Which element exhibits maximum catenation property?

2. Which group elements are called halogens?

3. Identify the type of reaction.

    (i) AB $\longrightarrow$ A + B   (ii) AB + CD $\longrightarrow$ AD + BC

    OR

    Which substance is added to foods high in oil and fat to prevent rancidity?

4. Refractive index of glass with respect to air is $\frac{3}{2}$, then what would be the refractive index of air with respect to glass?

5. Why water is seen blue in colour in a deep sea?

    OR

    Name the phenomena behind blue appearance of the sky.

6. When an object moves closer to a concave lens, what happens to the image formed by it?

    OR

    A light ray enters into a glass slab from the air. If both the angle of incidence and angle of refraction are equal, then what is the value of angle of refraction?

7. When two ends of a metallic wire are connected across the terminals of a cell, then some potential difference is set up between its ends. In which direction, electrons are flowing through the metallic wire?

OR

State the relation between potential difference, work done and charge moved.

8. A constant current I is flowing in a horizontal wire (placed in the plane of a paper) from East to West as shown in the given figure. What will be the direction of magnetic field at a point just above the wire?
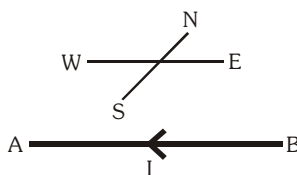
9. Name the enzyme present in pancreatic juice which help in digestion of proteins.

OR

Give examples of two organisms which show holozoic mode of nutrition.

10. What do you mean by homozygous condition?

11. Define food web.

12. Name the valve which is present between
   (i) Left atrium and left ventricle.
   (ii) Right atrium and right ventricle.

13. In an aquatic ecosystem, the organism present at the trophic level equivalent to cows in grasslands is
   (1) phytoplanktons   (2) large fishes   (3) sea gulls   (4) zooplanktons

Directions : Assertion-Reason Type Questions (Q. Nos. 14-16)

In each of the following questions, a statement of Assertion is given by the corresponding statement of Reason. Of the statements, mark the correct answer as :

(1) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(2) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(3) If Assertion is true, but Reason is false.

(4) If Assertion is false, but Reason is true.

14. Assertion : When Quick lime added to water, formation of slaked lime is a combination reaction.

   Reason : The reaction in which two or more substances combine to form a single new substance are called combination reaction.

15. Assertion : Xylem transport is unidirectional
   Reason : Phloem transport is bi-directional

OR

   Assertion : Left atrium has the thickest muscular wall among all the chambers of heart.
   Reason : Left atrium receives oxygenated blood from lungs.

16. Assertion : When focal length of a lens increases, then its power decreases.
   Reason : Power of a lens is inversely proportional to focal length of lens.

17. **Read the following passage. Answer any four questions from 17 (a) to 17 (e).**

Respiration is the process by which the food taken through nutrition gets oxidised to release energy for various activities.

Process of respiration can be divided into the following two categories :

(1) Aerobic respiration   (2) Anaerobic respiration

Aerobic respiration : It is a process in which there is complete break down of food (glucose) into carbon dioxide and water in the presence of oxygen and energy is released.

Anaerobic respiration : It is partial breakdown of food (glucose) without using molecular oxygen. In this type of respiration less amount of energy is produced.

(a) Which of the following processes is responsible for cramps in the muscles of sportsman?

(1) Non conversion of glucose to pyruvate

(2) Conversion of pyruvate to lactic acid due to deficiency of oxygen.

(3) Conversion of pyruvate to glucose in presence of oxygen

(4) Conversion of pyruvate to ethanol

(b) Yeast is used in wine and beer industries because it respires

(1) Aerobically producing oxygen   (2) Aerobically producing alcohol

(3) Anaerobically producing alcohol   (4) Anaerobically producing lactic acid

(c) Select the wrong statement with respect to glycolysis.

(1) It occurs in the cytoplasm

(2) It is an anaerobic phase

(3) Glucose is broken down to form 2 molecules of pyruvic acid

(4) None of these

(d) A test tube containing sugar solution and yeast is kept in a warm place overnight. Few drops of oil is also put in the test tube to cut contact from external air. The gas collected from this mixture

(1) extinguishes the flame   (2) bursts into flame when ignited

(3) turns lime water milky   (4) both (1) and (3)

(e) Animal cells are suspended in a culture medium that contains excess glucose. The graph shows glucose utilization under different growth conditions. (A), (B) and (C) in the graph indicate
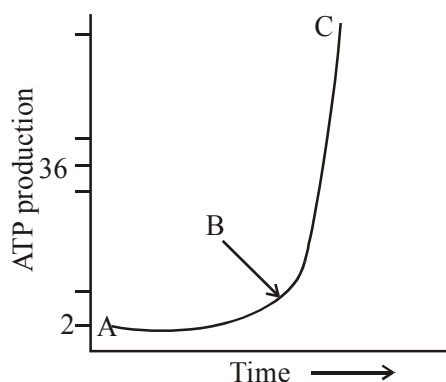
(1) A – Anaerobic respiration

   B – Introduction of O_2 to culture medium

   C – Aerobic respiration

(2) A – Aerobic respiration

   B – Introduction of CO_2 to culture medium

   C – Anaerobic respiration

(3) A – Aerobic respiration

    B – Supply of organic triphosphate

    C – Aerobic respiration

(4) A – Aerobic respiration

    B – Introduction of CO to culture medium

    C – Anaerobic respiration

18. **Read the following passage. Answer any four questions from 18(a) to 18(e).**

When a more reactive metal is placed in a salt solution of less reactive metal, then the more reactive metal displaces the less reactive metal from its salt solution. This reaction is also known as displacement reaction.The arrangement of metals in order of decreasing reactivities is called reactivity series or activity series of metals. After performing displacement experiments the following series has been developed.
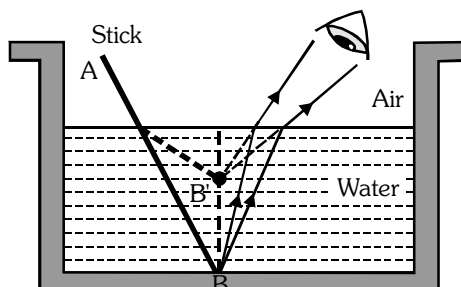
Reactivity series of metals

	Potassium	K	**Most reactive metal**
Metal more reactive than hydrogen	Sodium	Na	
	Calcium	Ca	
	Magnesium	Mg	
	Aluminium	Al	
	Zinc	Zn	
	Iron	Fe	
	Nickel	Ni	
	Tin	Sn	
	Lead	Pb	
	Hydrogen	H	
	Copper	Cu	
	Mercury	Hg	
Metal less reactive than hydrogen	Silver	Ag	
	Platinum	Pt	
	Gold	Au	**Least reactive metal**

Reactivity Increases (upward) / Reactivity Decreases (downward)

(a) Which of the following is the correct arrangement of the given metals in order of their reactivity?

Zinc, Iron, Magnesium, Sodium

(1) Zinc > Iron > Magnesium > Sodium

(2) Sodium > Magnesium > Iron > Zinc

(3) Sodium > Zinc > Magnesium > Iron

(4) Sodium > Magnesium > Zinc > Iron

(b) Which of the following pairs will give displacement reactions?

(1) $FeSO_4$ solution and Copper metal

(2) $AgNO_3$ solution and Copper metal

(3) $CuSO_4$ solution and Silver metal

(4) $NaCl$ solution and Copper metal

(c) Copper sulphate solution can be easily kept in a container made of

(1) Lead   (2) Zinc   (3) Silver   (4) Aluminium

(d)   Which is correct order as per the reactivity of the metals?

(1) Zn > Fe > Cu > Ag   (2) Fe > Zn > Cu > Ag

(3) Cu > Zn > Fe > Ag   (4) Zn > Cu > Fe > Ag

(e)   Which of the following does not react with water?

(1) Lithium   (2) Magnesium   (3) Copper   (4) Calcium

19.   Read the following and answer any four questions from 19(a) to 19 (e):

The resistance of a conductor depends on its dimensions like, length and area of cross-section and also on the nature of material and temperature of the conductor. On the other hand, resistivity of a conductor remains independent of its dimensions but it depends on temperature. For example, If a copper conductor is stretched along its length or it is cut, its resistance vary but resistivity remains unchanged.

(a)   A conductor A of resistance R is stretched to double its length and another conductor B of resistance 2R is cut in two equal lengths. The ratio of the resistances of the 'stretched conductor A' and 'half part of the conductor B' is

(1) 2 : 1   (2) 1 : 1   (3) 4 : 1   (4) 8 : 1

(b)   Figure shows V-I graphs for a Copper, Silver and Aluminium wire of same dimensions. Which graph provides the resistance of silver wire?

(1) A   (2) B

(3) C   (4) Cannot be predicted

(c)   Recasting of a cylindrical conductor of resistance 20 Ω is done having its new radius half than the earlier and keeping its length unchanged. Then, the new resistance of the conductor will be

(1) 80 Ω (2) 10 Ω (3) 20 Ω (4) 5 Ω

(d)   Resistance of a cylindrical conductor is

(1) directly proportional to radius of the conductor.

(2) inversely proportional to radius of the conductor.

(3) directly proportional to square of length of the conductor.

(4) inversely proportional to square of the radius of the conductor.

(e)   With increase in the temperature of the conductor, the resistance of the conductor

(1) decreases   (2) increases

(3) remains unchanged   (4) first increases, then decreases

20. **Read the following and answer any four questions from 20(a) to 20 (e):**

In an experiment, a stick is partly immersed in water, as shown in figure. The stick inside the water appears to be bent.


(a) Due to which phenomenon of light the stick appears to bent inside the water?

    (1) Reflection   (2) Refraction

    (3) Dispersion   (4) Scattering

(b) If the refractive index of water is $\dfrac{4}{3}$, what is the speed of light in water?

    (1) 0.5×10^4 ms^{-1} (2) 2×10^4 ms^{-1}

    (3) 3×10^8 ms^{-1} (4) 2.25×10^8 ms^{-1}

(c) Four students A, B, C and D showed the following traces of the path of a ray of ligh passing through a rectangular glass slab.
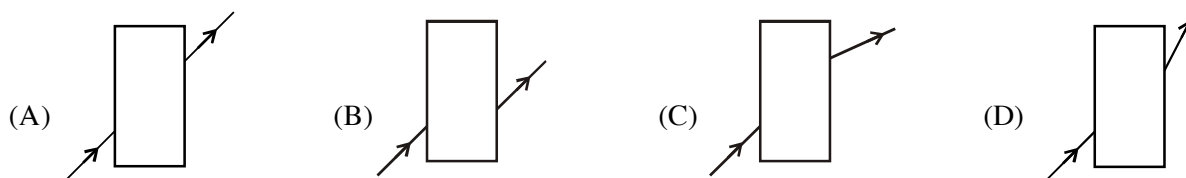
Which of the traces most likely to be correct?

    (1) A   (2) B   (3) C   (4) D

(d) In an experiment to trace the path of a ray of light through a rectangular glass slab, three students Raman, Mohit and Suresh tabulated their observations as given below :

Student	Raman	Mohit	Suresh
$\angle i$	60°	60°	60°
$\angle r$	50°	40°	35°
$\angle e$	62°	56°	60°

The student who has performed the experiment with all resources and sincerity

    (1) Raman   (2) Mohit

    (3) Suresh   (4) Both Raman and Suresh

(e) Which of the following diagrams shows the refracted ray of light correctly?
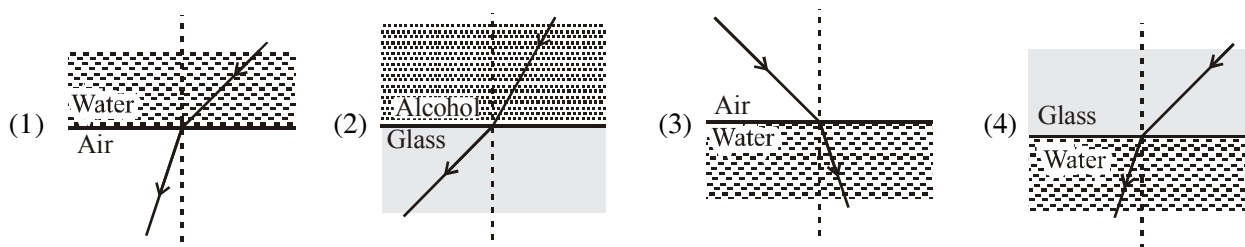
SECTION-B

21. (a) State the electron-dot structure for calcium and sulphur.

(b) Show the formation of CaS by the transfer of electrons.

OR

Solid sodium bicarbonate was placed on a strip of pH paper. What was the change in colour? What does the change in colour indicate?

22. Give the classification of covalent bond along with examples.

23. Give any two differences between asexual reproduction and sexual reproduction.

OR

What is the difference between a bisexual flower and unisexual flower. Give two examples of each.

24. Name the excretory organ and main nitrogenous waste product of following organisms.

(i) Earthworm   (ii) Insects   (iii) Flatworm   (iv) Humans

25. An object of height 1.2 cm is placed before a concave mirror of focal length 20 cm so that a real image is formed at a distance of 60 cm from it. Find the position of the object. What will be the height of the image formed?

26. Two wires of same metal have the same length but their cross-sectional areas are in the ratio 8 : 5. The resistance of the thicker wire is 10 Ω. What is the resistance of the other wire?

OR

Draw magnetic lines of force for a current carrying solenoid. Also, explain the pole formation at this ends.

SECTION-C

27. Identify the oxidant and reductant in each of the following reactions.

(i) $MnO_2 + 4HCl \longrightarrow MnCl_2 + Cl_2 + 2H_2O$

(ii) $CuO + H_2 \longrightarrow Cu + H_2O$

(iii) $PbO + C \longrightarrow Pb + CO$

28. Write the chemical equation of the reaction in which the following changes have taken place with an example of each:

(i) Change in colour

(ii) Change in temperature

(iii) Formation of precipitate

OR

While eating food you spill some curry on your white shirt. You immediately scrub it with soap. What happens to its yellow colour on scrubbing with soap? What happens to this stain when the shirt is washed with plenty of water?

29. What is allotropy? Give two properties of diamond.

30. (i) What do you mean by ten percent law given by Lindeman?

     (ii) What is the importance of decomposers in an ecosystem?

OR

Differentiate between biodegradable and nonbiodegradable wastes. Give two examples of each.

31. List any three characters which Mendel studied in garden pea plants. Also give their dominant and recessive forms.

32. (i) Draw a well labelled diagram showing structure of heart.

     (ii) What is the function of RBC in blood?

33. Draw a circuit diagram of an electric circuit containing a cell, a key, an ammeter, a resistor of 4Ω in series with a combination of two resistors (8Ω each) in parallel and a voltmeter across this parallel combination. Each of them dissipate energy and can withstand a maximum power of 16W without melting. Find the maximum current that can flow through the three resistors.

SECTION-D

34. How does metallic character vary across a period? Give the decreasing order of atomic size of group 2nd elements. Which is the most electronegative element among group 17 elements?

OR

State reason for the following statements.

(i) Tap water conducts electricity, whereas distilled water does not.

(ii) Dry hydrogen chloride gas does not turn blue litmus red whereas dilute hydrochloric acid does.

(iii) During summer season, a milk man usually adds very small amount of baking soda to fresh milk.

(iv) For dilution of acids, acid is added into water and not water into acid.

(v) Curd and sour substances not be kept in brass and copper vessels.

35. Describe female reproductive system in humans with the help of a well labelled diagram.

OR

(i) List the various methods of contraception with one example of each.

(ii) What do you mean by sexually transmitted diseases? Give two examples.

36. (a) Explain the term refraction of light.

     (b) Letters written on paper when seen through a rectangular glass slab appear to be raised. Explain this phenomenon with the help of ray diagram.

     (c) A diamond of refractive index 2.42 is kept inside a glass container filled completely with a liquid. Calculate the refractive index of diamond with respect to the liquid. (Speed of light in liquid = 1.5×10^8 m/s)

SECTION-A

1. Carbon

2. Group seventeen elements

3. (i) Decomposition reaction

(ii) Double displacement reaction.

OR

Antioxidants are added to foods high in oil and fat to prevent rancidity. Antioxidants prevent oxidation of fats and oils.

4. Refractive index of glass with respect to air, $_an_g = \dfrac{3}{2}$

$\therefore$ Refractive index of air with respect to glass, $_gn_a = \dfrac{1}{_an_g} = \dfrac{1}{3/2} = \dfrac{2}{3}$

5. The blue colour of water in deep sea is due to scattering of light, as the blue colour being of shorter wavelength scattered most by water molecules.

OR

Scattering of light.

6. When the object is at infinity, its virtual, erect and point sized image is formed at the focus of concave lens. When the object is moved towards the lens, the image is also moved from the focus, towards the lens and its size increases.

OR

When the incident ray falls normally on the glass slab, it will refract without deviation, i.e., along the normal in the glass slab. In this situation, $\angle i = \angle r = 0°$.

7. Electrons are flowing through the wire from lower potential end (negative terminal of cell) to higher potential end (positive terminal of cell).

OR

The relation between potential difference, work done and charge moved is given by,

Potential difference $= \dfrac{\text{Work done}}{\text{Charge moved}}$

i.e. $V = \dfrac{W}{q}$

8. According to right hand thumb rule, if you hold the wire in right hand, keeping thumb from East to West, the curved fingers will direct from South to North at a point lying directly above the wire.

9. Trypsin

OR

Cow and Lion

10. In homozygous condition two factors of a character are same (TT).

11. The inter - connected food chains operating in an ecosystem which establish a network of relationships between various species is called a food web.

12. (i) Mitral or bicuspid valve

(ii) Tricuspid valve

13. Option (4)

14. Option (1)

15. Option (2)

OR

Option (4)

16. Option (1)

Power of lens, $P = \dfrac{1}{\text{Focal length, f(in m)}}$

17. (a) Option (2)

(b) Option (3)

(c) Option (4)

(d) Option (4)

(e) Option (1)

18. (a) Option (4)

(b) Option (2)

(c) Option (3)

(d) Option (1)

(e) Option (3)

19. (a) Option (3)

Conductor A : $R_A = \rho \dfrac{\ell}{A} = R$ and After stretching, $R'_A = 2^2 R_A = 4\,R$

Conductor B : $R_B = 2R$ and for half length of conductor, $R'_B = \dfrac{2R}{2} = R$

So, $\dfrac{R'_A}{R'_B} = \dfrac{4R}{R} = \dfrac{4}{1}$

(b) Option (3)

Slope of V-I graph gives resistance of the conductor. Silver has least resistance among the given conductor samples here. So its slope for V-I graph will be least.

(c) Option (1)

$R = \rho \dfrac{\ell}{A} = \rho \cdot \dfrac{\ell}{\pi r^2} = 20\,\Omega$ (given)

Now, $r' = \dfrac{r}{2}$, $\ell' = \ell$

$\therefore \quad R' = \rho \dfrac{\ell'}{A'} = \rho \cdot \dfrac{\ell}{\pi \left(\dfrac{r}{2}\right)^2} = 4\,R = 4 \times 20 = 80\ \Omega$

(d) Option (4)

$$R = \rho\frac{\ell}{A} = \rho\frac{\ell}{\pi r^2} \qquad \Rightarrow \qquad R \propto \frac{1}{r^2}$$

(e) Option (2)

20. (a) Option (2)

The stick partly immersed in water appears to be bent due to refraction of light.

(b) Option (4)

Refractive index of water,

$$n_W = \frac{\text{Speed of light in vacuum}}{\text{Speed of light in water}}$$

$$\Rightarrow \quad \frac{4}{3} = \frac{3 \times 10^8}{v}$$

$$\Rightarrow \quad v = 2.25 \times 10^8 \text{ ms}^{-1}$$

(c) Option (2)

When a ray of light incidenting obliquely, passes through a rectangular glass slab, the emergent ray is parallel to the incident ray, having some lateral shift from incident ray. This is shown only in figure B.

(d) Option (3)

In the experiment of refraction through a glass slab,

Angle of incidence = Angle of emergence

This is observed by Suresh only. So, he has performed the experiment with all resources and sincerity.

(e) Option (3)

When a ray of light goes obliquely from optically rarer medium to optically denser medium, it bends towards the normal, at the point of incidence.

Air is optically rarer than water. So, when light ray goes from air to water, it bends towards the normal.

SECTION-B

21. (a) Ca: $\ddot{S}$:
  2, 8, 8, 2   2, 8, 6

  (b) Ca $\longrightarrow$ Ca^{2+} + 2e$^-$

  S + 2e$^-$ $\longrightarrow$ S^{2-}

  Ca $\overset{\times}{\underset{\times}{\rightrightarrows}}$ $\ddot{S}$:   (Ca^{2+})   ($\overset{\times}{\underset{\cdot\cdot}{S}}^{2-}$)
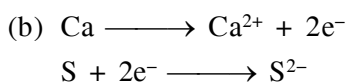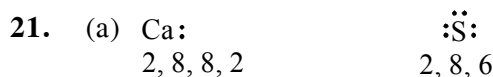
OR

The colour of the pH paper will not change because solid sodium bicarbonate does not produce ions and thus does not give any colour on pH paper.

22. Covalent bond are of three types

(a) Single covalent bond : A single covalent bond is formed by the sharing of one pair of electrons between the two atoms.

eg. H₂ or H – H

(b) Double covalent bond : A double covalent bond is formed by the sharing of two pairs of electrons between the two combining atoms

eg. O_2 or O = O

(c) Triple covalent bond : A triple covalent bond is formed by the sharing of three pairs of electrons between the two combining atoms.

eg N_2 or N ≡ N

23. **Differences between asexual and sexual reproduction (any two)**

Features	Asexual reproduction	Sexual reproduction
Number of parents involved	One	Two
Resemblance with parents	Organisms produced resemble exactly with the parent.	Organisms do not resemble exactly with the parent but resemble in certain features with both the parents.
Type of cell divisions	Amitotic / mitotic.	Mitotic and meiotic both are present.
Time duration for multiplication	Takes less time.	Takes more time.
Variations	Variations are very less.	Variations are present.
Adaptability	Organisms produced have less adaptability.	Organisms produced have more adaptability.

OR

When the male and female reproductive parts are present in the same flower, it is called a bisexual flower e.g. Hibiscus, Mustard.

When the male and female reproductive parts are present in different flowers, they are called unisexual flowers e.g.Papaya, Date palm, Mulberry, Gourd, Water melon. (any two)

24.

	Organisms	Excretory Organ	Waste products
(i)	Earthworm	Nephridia	Ammonia or urea
(ii)	Insects	Malpighian tubules	Uric acid
(iii)	Flatworm	Protonephridia (flame cells)	Mainly ammonia
(iv)	Humans	Kidneys	Urea

25. h_0 = 1.2 cm, f = − 20 cm, v = −60 cm

Mirror formula, $\dfrac{1}{f} = \dfrac{1}{v} + \dfrac{1}{u}$

$\Rightarrow \quad \dfrac{1}{u} = \dfrac{1}{f} - \dfrac{1}{v}$

$\Rightarrow \quad \dfrac{1}{u} = \dfrac{1}{-20} - \dfrac{1}{-60} = \dfrac{-1}{20} + \dfrac{1}{60} = \dfrac{-3+1}{60} = \dfrac{-1}{30}$

$\Rightarrow \quad u = -30$ cm

Also, $\dfrac{h_i}{h_0} = \dfrac{-v}{u} \qquad \Rightarrow h_i = -\dfrac{-60}{-30} \times 1.2 = -2.4$ cm

26. Let the areas of two wires be A_1 and A_2, where

$\dfrac{A_1}{A_2} = \dfrac{8}{5}$ (given), which indicates that wire of area A_1 is thicker.

Given, resistance R_1 of wire of area $A_1 = 10\ \Omega$

As both the wires are of same material and same length, hence resistivity ρ will be same for both of them and length $\ell_1 = \ell_2 = \ell$ (say)
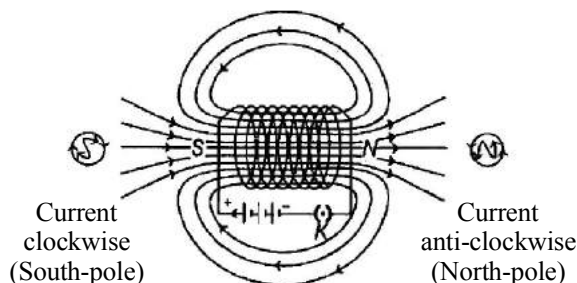
Now,

$$\frac{R_1}{R_2} = \frac{\left(\dfrac{\rho\ell}{A_1}\right)}{\left(\dfrac{\rho\ell}{A_2}\right)} = \frac{\rho\ell}{A_1} \times \frac{A_2}{\rho\ell} = \frac{A_2}{A_1} = \frac{5}{8} \qquad \left(\because R = \rho\frac{\ell}{A}\right)$$

$\Rightarrow \quad \dfrac{10}{R_2} = \dfrac{5}{8} \quad$ or $\quad R_2 = \dfrac{80}{5} = 16\ \Omega$

OR

Magnetic lines of force due to a current carrying solenoid are shown in figure below.

Current clockwise (South-pole)   Current anti-clockwise (North-pole)

Magnetic pole formation at the ends of solenoid can be explianed by looking at one face of the solenoid coil. If the direction of current through the coil is seen clokwise by looking at a face of solenoid coil, then that face has South polarity and if the direction of current is anti-clocwise, then that face has North polarity.
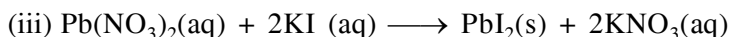
SECTION-C

27. (i) MnO_2 loses oxygen, therefore it is an oxidant while HCl gains oxygen, therefore it is a reductant.

(ii) CuO is oxidant, while H_2 is reductant.

(iii) PbO is oxidant, while C is reductant.

28. (i) $Cu(s) + 2AgNO_3\ (aq) \longrightarrow Cu(NO_3)_2(aq) + 2Ag$
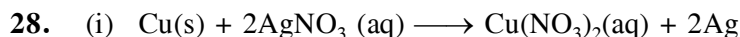
The solution will become blue in colour and shiny silver metal will be deposited.

(ii) $NaOH + HCl \longrightarrow NaCl + H_2O + heat$
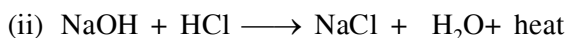
The temperature will increase because heat will be evolved.

(iii) $Pb(NO_3)_2(aq) + 2KI\ (aq) \longrightarrow PbI_2(s) + 2KNO_3(aq)$

Yellow ppt

Yellow precipitate of PbI_2 will be formed.

OR

On scrubbing, its colour changes from yellow to reddish brown. It happens because soap is basic in nature and the colour of turmeric changes from yellow to reddish brown in basic medium. When the shirt is washed with plenty of water, the stain turns yellow again.

29. The phenonmenon of existence of an element in two or more forms which have different physical properties but identical chemical properties is called as allotropy.

Properties of diamond

(i) It is transparent and colourless.

(ii) It sparkles brightly because it reflects most of light.

30. (i) Ten Percent law was put forth by Lindeman (1942). According to this law, transfer of energy from one trophic level to other trophic level is never 100 percent. It is so because most of energy gets lost as heat in the environment during each transfer. On an average, about 10% of energy is actually available to the next trophic level.

(ii) **Importance of decomposers**

1. They decompose the dead bodies of animals and plants thus acts as cleansing agents of the environment.

2. They help in recycling the material in biosphere thus, play a vital role in biogeochemical or nutrient cycles.

3. They maintain the fertility of soil.

4. If there were no decomposers, the earth would have been a heap of dead organisms.

OR

S.No.	Biodegradable waste	Non-biodegradable waste
1.	They can be broken down into simpler substances by the activity of biological catalysts called enzymes (present in surrounding bacteria or other saprophytes). Physical processes like heat and temperature help in the functioning of enzymes.	They can't be broken down into simpler and harmless products because the biological catalysts called enzymes can't act upon them. They can be acted upon only by some physical processes like heat and pressure.
2.	They can enter the biogeochemical cycles.	They cannot enter the biogeochemical cycles.
3.	They become pollutants only when they accumulate in large quantities and not degraded at the right time.	They always act as pollutants whether present in small or large quantity.
4.	All the biodegradable wastes should be treated properly before discharging them into water or soil.	They can't be treated properly before discharging them into water or soil. Instead, they can be either recycled or reused.
5.	They do not persist in the environment for a long time.	They persist in the environment for a long time.
6.	For example, Urine and faecal matter, Sewage, Paper, Vegetable and fruit peels, Agricultural residues, Wood and Cloth. (any two)	For example, Heavy metals like Mercury, Lead, Arsenic, Radioactive wastes like Uranium, Plutonium, Insecticides and Pesticides like DDT and BHC. (any two)

**31.** **Pairs of allelic characters found in garden pea plant (any three)**

	Properties	Dominant	Recessive
1	Height	Tall	Dwarf
2	Colour of seed	Yellow	Green
3	Colour of pod	Green	Yellow
4	Colour of flower	Violet	White
5	Shape of seed	Round	Wrinkled
6	Shape of pod	Inflated	Constricted
7	Position of flower	Axial	Terminal

32. (i)
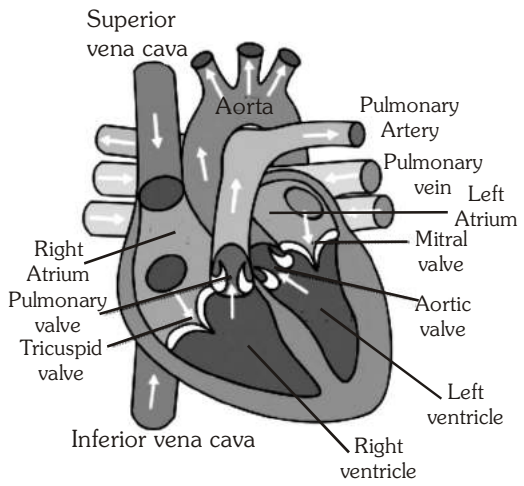
(ii) RBC mainly transports oxygen from the lungs to all tissues of the body. It also returns some amount of carbon dioxide from the tissues back to the lungs.

33.
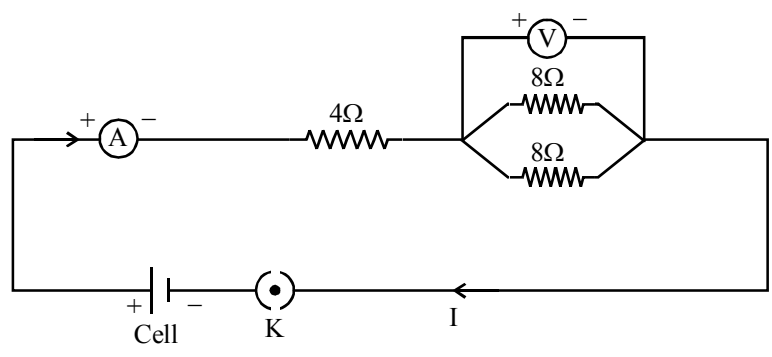
Maximum current through 4Ω resistor,

$$I = \sqrt{\frac{P}{R}} = \sqrt{\frac{16}{4}} = 2 \text{ A} \qquad \text{(Using relation, P = I}^2\text{R)}$$

Therefore, Maximum current through each 8Ω resistor,

$$I' = \frac{1}{2} \times 2 = 1A$$

SECTION-D

34. Across a period from left to right, number of valence electrons increases from 1 to 7 in the same valence shell. As a result effective nuclear charge acting on valence electrons increases and tendency to lose electrons decreases and tendency to gain electrons increases. Thus metallic character decreases across a period.

The decreasing order of atomic size of group 2nd elements is

Ba > Sr >Ca > Mg > Be.

Fluorine is the most electronegative element among group 17 elements.

OR

(i) Tap water contains ions which conduct electricity. Distilled water does not contain ions.

(ii) Dry HCl does not produce ions but dilute HCl gives H^+ and Cl^-.

(iii) Baking soda does not allow milk to change into lactic acid, which makes milk sour.

(iv) Diluting an acid is highly exothermic. Water should not be added to concentrated acid because the heat generated may cause the mixture to splash out and cause burns. Thus, acid is added to water.

(v) Curd and sour substance contain acid which react with copper and brass to form certain salts that are poisonous in nature and can cause food poisoning.

35.
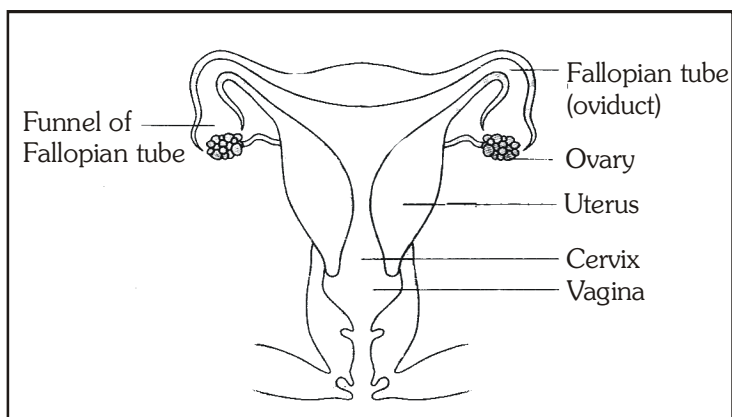
Female reproductive system

Female reproductive system in humans consist of :

(1) Ovaries : The ovaries are the primary sex organs of the female that lie in the lower part of the abdomen. The ovaries like the testes have both exocrine function that is production of ova and endocrine role that is secretion of female sex hormone, estrogen and progesterone.

(2) Fallopian tube (oviducts) : A fallopian tube is a long muscular tube. It conveys the egg from the ovary to the uterus and also provides the appropriate environment for its fertilization.

(3) Uterus : The uterus is a large, highly elastic sac specialized for the development of the embryo. The two oviducts unite to open into uterus. The uterus open into the vagina through the cervix.

(4) Vagina : It is large, elastic, muscular tube. It is adapted for receiving the semen during copulation, allowing menstrual flow and serving as birth canal during parturition.

OR

(i) **Various methods of contraception are :**

(a) Natural method

Intercourse is safe for a week before and week after menstruation.

(b) Mechanical methods (any one example)

(1) It includes use of condoms which are the rubber or plastic sheets put on the penis before coital activity.

(2) Use of diaphragms or cervical caps fitted in vagina of female to check the entry of sperms into the uterus and also helps in avoiding conception.

(3) Use of IUCD i.e., Intra Uterine Contraceptive Devices like copper T and loops fitted in the uterus, help to prevent fertilization and implantation of embryo. They can cause side effects due to irritation or infection of uterus.

(c) Chemical methods (any one example)

(1) It consists of using some chemicals which are spermicidal. They may be in form of tablets, jellies, paste and creams introduced in the vagina before coital activity.

(2) Another chemical method is the use of oral contraceptive (OC) pills which inhibit the secretion of FSH (Follicle Stimulating Hormone) and LH (Leutinising Hormone) from the anterior lobe of pituitary gland and thus inhibiting ovulation from the ovary. These contraceptive therefore change the hormonal balance so that egg cell are not released and hence prevent fertilization.

(d) Surgical methods (any one example)

(1) Tubectomy involves cutting of fallopian tubes in females and Vasectomy involves cutting of vas deferens of each side in males.

(2) Surgical removal of ovaries is known as ovariectomy and removal of testes is known as castration.

(3) Another surgical method is MTP i.e. Medical Termination of Pregnancy or abortion.

(4) Other method is tubal ligation in which fallopian tubes are blocked by an instrument called laproscope.

(ii) Sexually Transmitted Diseases (STDs) are infectious diseases which are spread by sexual contact, e.g. AIDS, Hepatitis, genital warts etc. (any two examples)

36. (a) The phenomena of bending of light ray, when it passes from an optically rarer medium to an optically denser medium or the other way round, is termed as refraction.

(b) Letters written on paper, when seen through a rectangular glass slab appears to be raised from their original position because of the phenomena of refraction of light. Light rays on passing from optically rarer medium to optically denser medium i.e., from air to the glass, bends toward the normal, and finally to reach our eyes, the light rays travel from glass to air where it bends away from the normal and thus, the letters seem to be raised.
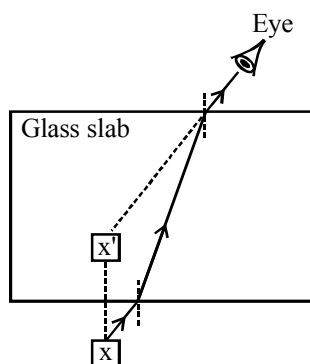
(c) Refractive index of diamond, $n_d = 2.42$

Speed of light in liquid = 1.5×10^8 m/s

Refractive index of liquid,

$$n_\ell = \frac{\text{Speed of light in air}}{\text{Speed of light in liquid}} = \frac{3 \times 10^8}{1.5 \times 10^8} = 2$$

Refractive index of diamond with respect to liquid,

$$_\ell n_d = \frac{\text{Refractive index of diamond}(n_d)}{\text{Refractive index of liquid}(n_\ell)} = \frac{2.42}{2} = 1.21$$