

## SAMPLE PAPER - 6

## Class 10 - Science

**Time Allowed: 3 hours**

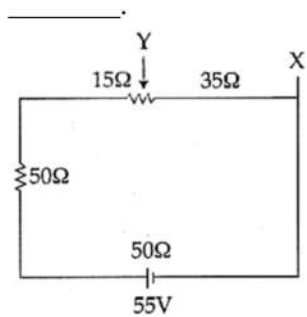
**Maximum Marks: 80**

### General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts

## Section A

1. From the shown figure, XY has a resistance of  $35\ \Omega$ , the potential difference across XY will be equal to [1]



- a) 13.44 V                      b) 12.83 V
- c) 10.01 V                      d) 14.67 V
2. Which of the following was not the outcome of Mendel's experiments? [1]
- a) Factors reside in chromosomes                      b) Segregation of factors
- c) Dominant trait                      d) Independent assortment
3. In the following diagram of the stomatal apparatus, which parts are incorrectly labelled ? [1]



a) II and III

b) I and V

c) I and IV

d) IV and V

4. What capacity of fuse wire is to be used for geyser?

[1]

a) 10 A

b) 15 A

c) 20 A

d) 5 A

5. Which of the following is not a silvery white metal?

[1]

a) Al

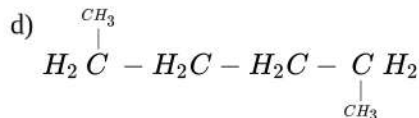
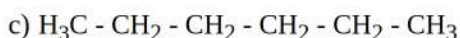
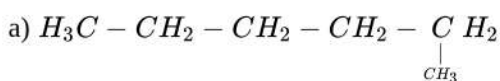
b) Pb

c) Sn

d) Ag

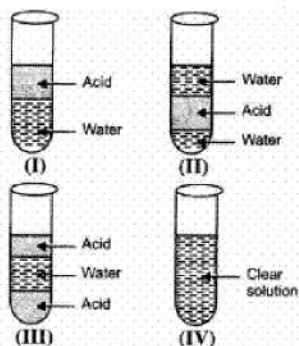
6. Which of the following is not a straight chain hydrocarbon?

[1]



7. 5 mL of acetic acid was added to equal volume of water and the mixture was shaken well for one minute and allowed to settle. The correct representation of the observation made would be as given in test tube

[1]



a) III

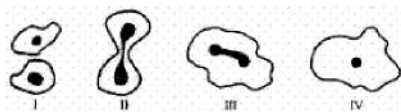
b) I

c) II

d) IV

8. Four stages of binary fission in Amoeba are shown below. The stage at which nuclear fission and cytokinesis are observed is stage

[1]



a) I

b) III

c) II

d) IV

9. Solid sodium bicarbonate was placed on a strip of pH paper. The colour of the strip

[1]

a) turned blue

b) turned light pink

c) did not change

d) turned green and suddenly yellow

10. Vegetative propagation refers to formation of new plants from [1]  
 a) stem, roots and flowers b) stem, flowers and fruits  
 c) stem, roots and leaves d) stem, leaves and flowers

11. The branch of biology-related with heredity and variation is called [1]  
 a) Livinglogy b) Genetics  
 c) Evolution d) Taxonomy

12. If the charge on an electron is  $1.6 \times 10^{-19}$  coulombs, how many electrons should pass through a conductor in 1 second to constitute 1 ampere current? [1]  
 a)  $6.25 \times 10^{-18}$  b)  $6.35 \times 10^{-18}$   
 c) None of these d)  $6.25 \times 10^{-19}$

13. Refractive indices of water, sulphuric acid, glass, and carbon disulphide are 1.33, 1.43, 1.53, 1.63 respectively. The light travels slowest in: [1]  
 a) sulphuric acid b) water  
 c) glass d) carbon disulphide

14. Aluminium foil is used for wrapping food because : [1]  
 a) it is ductile b) it is sonorous  
 c) it is malleable d) it is a good conductor of heat

15. A black strip of paper was clipped onto a destarched leaf in a potted plant to cover a part of the leaf. The plant was then exposed to sunlight for four hours, the paper strip was removed and the leaf was tested for starch. When iodine solution was added: [1]  
 a) The entire leaf turned blue-black. b) The uncovered part of the leaf became blue-black.  
 c) The colour of the iodine solution remain unchanged. d) The covered part of the leaf became blue-black.

16. In binary fission, the parent cell divides by the process: [1]  
 a) The nucleus first divides then cytoplasm b) The cytoplasm and nucleus do not divide  
 c) The cytoplasm first divides then nucleus d) Cytoplasm and nucleus divide at same time

17. **Assertion (A):** A current-carrying conductor experiences a force in a magnetic field. [1]  
**Reason (R):** The force acting on a current-carrying conductor in a magnetic field is due to interaction between magnetic field produced by the current-carrying conductor and external magnetic field in which the conductor is placed.  
 a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.  
 c) A is true but R is false. d) A is false but R is true.

18. **Assertion (A):** Baking powder is used in making cake instead of using baking soda. [1]  
**Reason (R):** Baking powder contains tartaric acid which reacts with sodium carbonate and removes bitter taste.

- a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.      d) A is false but R is true.

19. **Assertion (A):** Failure of secretion of growth hormone from an early age causes dwarfism in the patient. [1]

**Reason (R):** Growth hormone stimulates the body growth and elongation of long bones.

- a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.      d) A is false but R is true.

20. **Assertion (A):** Polythene bags and plastic containers are non-biodegradable substances. [1]

**Reason (R):** They can be broken down by micro-organisms in natural simple harmless substances.

- a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.      d) A is false but R is true.

### Section B

21. What would be the disadvantage of detergents over soaps? [2]

OR

What name is given to the reaction which take place when ethanoic acid reacts with ethanol in the presence of conc. sulphuric acid? Name the products obtained in this reaction.

22. Why are some patients of diabetes treated by giving injections of insulin? [2]

23. Give some methods that could be applied to reduce our intake of pesticides. [2]

24. What is the role of decomposers in the ecosystem? [2]

25. Define power of a lens. What is its unit? One student uses a lens of focal length 50 cm and another of -50 cm. [2]

What is the nature of the lens and its power used by each of them?

OR

Write the lens formula explaining the meaning of the symbols used.

26. With the help of an example, explain the process of hydrogenation. Mention the essential condition for the [2]

reaction and state the change in physical property with the formation of the product.

### Section C

27. On heating blue coloured powder of copper (II) nitrate in a boiling tube, copper oxide (black), oxygen gas and a [3]  
brown gas X is formed.

- Write a balanced chemical equation of the reaction.
- Identify the brown gas X evolved.
- Identify the type of reaction.
- What could be the pH range of the aqueous solution of the gas X?

28. A pencil when dipped in water in a glass tumbler appears to be bent at the interface of air and water. Will the [3]  
pencil to be bent to the same extent, if instead of water we use liquids like, kerosene or turpentine? Support your answer with reasons.

29. Mention three important features of fossils which help in the study of evolution. [3]

OR

Fertilization is possible if copulation has taken place during middle of menstrual cycle. Give reason.

30. Why do different rays deviate differently in the prism? [3]

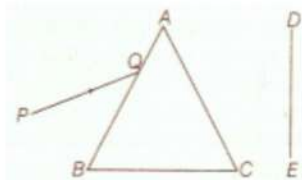


31. Justify with the help of an example that displacement reaction is also a redox reaction. [3]
32. A child questioned his teacher that why do organisms resemble their parents more as compared to grandparents. [3]  
In which way will the teacher explain to the child?

OR

A man with type A blood has a wife with type B. They have a child with type O blood. Give the genotype of all the three. What other blood groups can be expected in the future offspring of this couple?

33. A narrow beam PQ of white light is passing through a glass prism ABC as shown in the diagram. [3]



Trace it on your answer sheet and show the path of the emergent beam as observed on the screen DE.

- Write the name and cause of the phenomenon observed.
- Where else in nature is this phenomenon observed?
- Based on this observation, state the conclusion which can be drawn about the constituents of white light.

#### Section D

34. What are the various methods used for concentration of ore/Ore dressing? [5]

OR

- How is the method of extraction of metals high up in the reactivity series different from that for metals in the middle? Why cannot the same process be applied for them? Name and explain the process of extraction of sodium?
- Draw a labelled diagram of electrolytic refining of copper.

35. a. Define excretion. [5]

b. Name the basic filtration unit present in the kidney.

c. Draw excretory system in human beings and label the following organs of excretory system which perform following functions;

- form urine.
- is a long tube which collects urine from kidney.
- store urine until it is passed out.

OR

Discuss the structure of cross-section of leaf.

36. Describe the activity that shows that a current-carrying conductor experiences a force perpendicular to its length and the external magnetic field. How does Fleming's left-hand rule help us to find the direction of the force acting on the current-carrying conductor? [5]

#### Section E

37. Read the text carefully and answer the questions: [4]

The electrical energy consumed by an electrical appliance is given by the product of its power rating and the time for which it is used. The SI unit of electrical energy is Joule. Actually, Joule represents a very small quantity of energy and therefore it is inconvenient to use where a large quantity of energy is involved. So for commercial purposes, we use a bigger unit of electrical energy which is called kilowatt-hour. 1 kilowatt-hour is equal to  $3.6 \times 10^6$  joules of electrical energy.

- The energy dissipated by the heater is E. When the time of operating the heater is doubled, what would be the energy dissipated?



- (ii) The power of a lamp is 60 W. What will be the energy consumed in 1 minute?

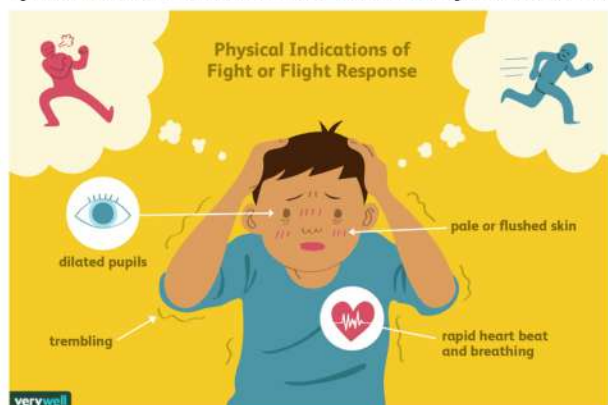
OR

The electrical refrigerator rated 400 W operates 8 hours a day. The cost of electrical energy is ₹5 per kWh. Find the cost of running the refrigerator for one day.

38. **Read the text carefully and answer the questions:**

[4]

Adrenaline is secreted directly into the blood and carried to different parts of the body. The target organs or the specific tissues on which it acts include the heart. As a result, the heart beats faster, resulting in the supply of more oxygen to our muscles. The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs. This diverts the blood to our skeletal muscles. The breathing rate also increases because of the contractions of the diaphragm and the rib muscles. All these responses together enable the animal body to be ready to deal with the situation. Such animal hormones are part of the endocrine system which constitutes the second way of control and coordination in our body.



- (i) How does chemical coordination take place in animals ?  
(ii) Which hormone is called an emergency hormone?  
(iii) Where are the adrenal gland present in our body?

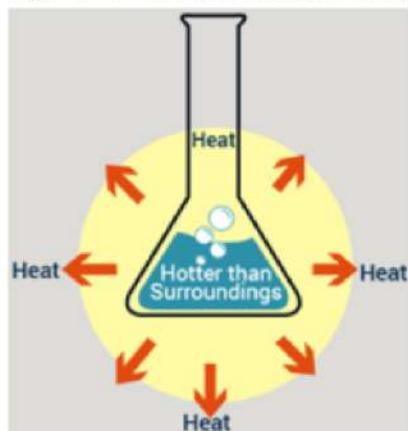
OR

How does our body respond when adrenaline is secreted into the blood ?

39. **Read the text carefully and answer the questions:**

[4]

The dissolving of an acid or a base in water is a highly exothermic reaction. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets.



- (i) What is the exothermic reaction?  
(ii) Write an example of an exothermic reaction.



(iii) How will you obtain sulphuric acid from an acidic oxide?

**OR**

While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid ?



## Solution

### SAMPLE PAPER - 6

#### Class 10 - Science

#### Section A

1. (b) 12.83 V

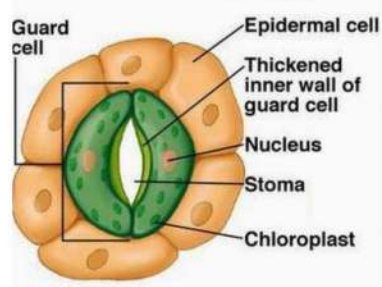
**Explanation:** 12.83 V

2. (a) Factors reside in chromosomes

**Explanation:** Gregor Mendel, through his work on pea plants, discovered the fundamental laws of inheritance. He deduced that genes come in pairs and are inherited as distinct units, one from each parent. Mendel tracked the segregation of parental genes and their appearance in the offspring as dominant or recessive traits.

3. (a) II and III

**Explanation:** Except these parts, other labeling are correct.



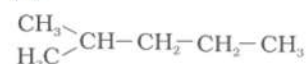
4. (b) 15 A

**Explanation:** The power circuit with a 15 A fuse is used for running the electric heater, electric iron, geyser, refrigerator, etc. as it draws more current.

5. (b) Pb

**Explanation:** Freshly cut solid lead has a bluish-white color that soon tarnishes to a dull greyish color when exposed to air.

6. (b)



**Explanation:** In this option, three carbon atoms are sharing electrons with univalent atoms. In other options, only two carbon atoms are sharing electrons with univalent atoms.

7. (d) IV

**Explanation:** Acetic acid dissolves in water forming clear solution.

8. (c) II

**Explanation:** At this stage nuclear fission and cytokinesis are observed.

9. (c) did not change

**Explanation:** Solid  $\text{NaHCO}_3$  does not change pH paper. It changes only in aqueous solution.

10. (c) stem, roots and leaves

**Explanation:** Vegetative propagation is a type of asexual reproduction. In this, new plants are produced by the parts of plants like stem, roots, and leaves without the help of any reproductive organ.

11. (b) Genetics

**Explanation:** Genetics is the study of genes, genetic variation, and heredity in living organisms. It is generally considered a field of biology, but intersects frequently with many other life sciences and is strongly linked with the study of information systems.

12. (a)  $6.25 \times 10^{-18}$

**Explanation:** Given,

Charge moved =  $1.6 \times 10^{-19}$  coulombs

Current,  $I = 1\text{A}$

Time taken,  $t = 1\text{ s}$

We know that,

$$I = \frac{Q}{t}$$

$$1 = \frac{Q}{1}$$

$$Q = 1\text{ C}$$

We also know that when the charge is  $1.6 \times 10^{-19}$  coulombs, the number of electrons present is 1

Therefore, when a charge of 1 coulomb is present, the number of electrons is given as:

$$\frac{(1)}{(1.6 \times 10^{-19})} = 0.625 \times 10^{-19} = 6.25 \times 10^{-18}$$

13. (d) carbon disulphide

**Explanation:** carbon disulphide

14. (c) it is malleable

**Explanation:** it is malleable

15. (b) The uncovered part of the leaf became blue-black.

**Explanation:** The uncovered part of the leaf became blue-black.

16. (a) The nucleus first divides then cytoplasm

**Explanation:** In binary fission of Amoeba, the nucleus of the Amoeba first divides to form two daughter nuclei by the process of Karyokinesis. After the nucleus has divided into two, the process of Cytokinesis takes place in which the cytoplasm in the mother cell divides into two daughter cells. This leads to the formation of the two daughter Amoebae cell having a nucleus and its own cell organelles.

17. (b) Both A and R are true but R is not the correct explanation of A.

**Explanation:** When a current-carrying conductor is placed in a magnetic field, it experiences a force except when it is placed parallel to the magnetic field. The force acting on a current-carrying conductor in a magnetic field is due to interaction between magnetic field produced by the current-carrying conductor and external magnetic field in which the conductor is placed.

18. (a) Both A and R are true and R is the correct explanation of A.

**Explanation:** Baking powder is used in making cake instead of using baking soda because, baking powder contains tartaric acid which reacts with sodium carbonate and removes bitter taste.

19. (a) Both A and R are true and R is the correct explanation of A.

**Explanation:** Growth hormone is secreted by the anterior lobe of the pituitary gland. It stimulates body growth. The failure of secretion of growth hormone from an early age causes dwarfism while excessive secretion of this hormone from childhood leads to gigantism.

20. (c) A is true but R is false.

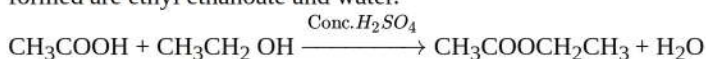
**Explanation:** Substances like polythene bags and plastics are non-biodegradable because they cannot be broken down by micro-organisms into simpler harmless substances in nature. A substance that can be broken down by microorganisms in natural simple harmless substances are biodegradable substances.

### Section B

21. Some of the detergents are non-biodegradable, i.e. they cannot be decomposed by microorganisms like bacteria, hence, causes water pollution in lakes and rivers.

OR

When ethanoic acid reacts with ethanol in presence of conc.  $\text{H}_2\text{SO}_4$  the reaction is called esterification. In this reaction products formed are ethyl ethanoate and water.



22. Insulin hormone is secreted by pancreas, regulates the levels of sugar in the blood. In diabetic patients it is not secreted in required amount therefore blood sugar level rises and causes various harmful effects. So, to prevent these effects some patients of diabetes are treated by giving injections of insulin to lower the sugar level in blood.

23. Following methods could be applied to reduce the intake of pesticides:

- Minimise the use of pesticides, and use other methods to control pests
- Consuming washed fruits and vegetables which will wash away the harmful pesticides
- Developing vegetarian feeding habits as biological magnification of a harmful chemical increases with increasing trophic level.(i.e. feed upon plants as plants belong to lower trophic level so, they have less accumulation of insecticides, whereas



organisms of higher trophic level have higher concentration of insecticides and pesticides).

24. Decomposers include micro-organisms such as bacteria and fungi that obtain nutrients by breaking down the remains of dead plants and animals. They help in the breakdown of organic matter or biomass from the body of dead plants and animals into simple inorganic raw materials, such as  $\text{CO}_2$ ,  $\text{H}_2\text{O}$ , and some nutrients.
25. The degree of convergence and divergence provided by a lens is called the power of the lens. The unit of power of lens is Diopter D.

The focal length of the lens used by the first student is positive hence it is a convex lens. The lens of the second student is a concave lens.

$$p = \frac{1}{f} = \frac{1}{0.5} = 2 \text{ Power of lens (first student)} = +2$$

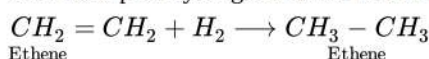
$$\text{Power of lens (second student)} = -2$$

OR

The equation relating the distance of object (u), distance of image (v) and focal length (f) of a lens is called the lens formula. It is same for both convex and concave lenses and is represented as:

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

26. Hydrogenation is the chemical process in which hydrogen molecule is added to an unsaturated hydrocarbon to make a saturated one. Example. Hydrogenation of Ethene.



**Conditions Required:** This reaction takes place in the presence of catalyst like Ni or Pt.

Change in Physical Properties:

- Physical State:** Liquid to Solid
- Density:** Increases
- Melting Point:** Increases

### Section C

27. i.  $2\text{Cu}(\text{NO}_3)_2(s) \xrightarrow{\text{Heat}} 2\text{CuO}(s) + 4\text{NO}_2(g) + \text{O}_2(g)$   
Copper (II) nitrate      (Black)      (Brown)(X)      Oxygen
- ii. Nitrogen dioxide is the brown gas(X).
- iii. Thermal decomposition reaction
- iv.  $\text{pH} < 7$  because  $\text{NO}_2$  dissolves in water to form acidic solution (pH lies below 7).

28. We know that pencil appears to be bent at the interface of air and water because of refraction of light. The degree of refraction depends on refractive index of a given liquid. Refraction indices of kerosene, water and other liquids would be different. Hence, degree of bend would be different in case of different liquids.

29. i. Fossils represent modes of preservation of ancient species.
- ii. Fossils help in establishing evolutionary traits among organisms and their ancestors that is their phylogeny.
- iii. The age of the fossil helps in determining the time period in which that species lived and how old are the fossils.

OR

Fertilization takes place in the fallopian tube only if mature ovum is released. In a normal menstrual cycle, ovulation occurs during middle of sexual cycle. Thus if copulation occurs only during this period only then fertilization is possible.

30. Different wavelengths deviate differently in the prism because the angle of refraction for different colours having different wavelengths is different while passing through the glass prism (medium). A light ray is refracted when it passes from one medium to another at an angle and its speed changes. At the interface, it is bent in one direction if the material it enters is denser (when light slows down) and in the other direction if the material is less dense (when light speeds up). Because different wavelengths (colours) of light travel through a medium at different speeds, the amount of bending is different for different wavelengths. Violet is bent the most and red the least because violet light has a shorter wavelength, and short wavelengths travel more slowly through a medium than longer ones do.

31. Consider the following displacement reaction:  $\text{Fe}(s) + \text{CuSO}_4 \rightarrow \text{FeSO}_4(aq) + \text{Cu}(s)$   
Iron      Copper      Iron(II) Sulphate      Copper  
Blue      Sulphate      (Reddish-brown)        
      Green

In the above reaction, Fe is converted to  $\text{Fe}^{2+}$  by loss of electrons. Hence Fe is oxidised.  $\text{Cu}^{2+}$  is converted to Cu by gain of electrons. Hence  $\text{Cu}^{2+}$  is reduced. Thus, the above reaction is a displacement reaction as well as a redox reaction.

32. The two parents involved in sexual reproduction produce gametes which fuse together forming a zygote. It gradually develops into a young child showing certain similarities with the parents.

Since, a child inherits its characters from both the parents the resemblance with them is very close. The grandparents and the child

resemble less closely because a gap of gene pool is created by the parents of the child. Since the child is immediate generation next to his parent thus to carry more similar genes as that of parents. Variations are more with grandparents.

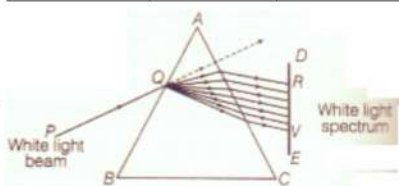
OR

a. Genotypes. Man ( $I^A I^O$ ) Mother  $I^B I^O$  and child  $I^O I^O$ .

b. Blood group of the future offspring. A type, B type, O type and AB type. It is based on the following cross:

| ♀ \ ♂ | $I^A$     | $I^O$     |
|-------|-----------|-----------|
| $I^B$ | $I^A I^B$ | $I^B I^O$ |
| $I^O$ | $I^A I^O$ | $I^O I^O$ |

33.

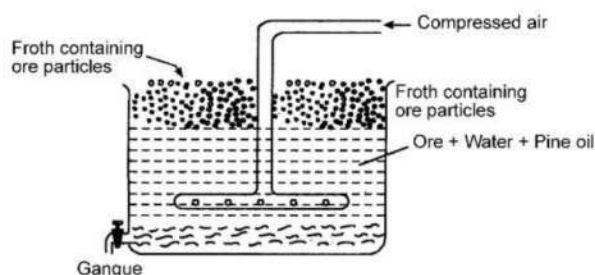


- The phenomenon of splitting of white light into its constituent colours is called dispersion of light. It is caused due to difference in speed of constituent colours of light travel in the medium other than air/vacuum because of different speed they bend at different angles.
- In nature, this Phenomenon is observed in formation of rainbow where all the seven colours constituting white light is visible.
- Based on phenomenon of dispersion, we can conclude that
  - White light consists of seven colours. Violet, indigo, blue, green, yellow, orange and red.
  - Violet light suffers maximum deviation and red light suffers minimum deviation.

#### Section D

34. Concentration of Ore: The process of removal of unwanted impurities like sand, rocky material, earthy particles etc. from the ore is called ore concentration or ore dressing. The finely ground ore is concentrated by any of the following processes:

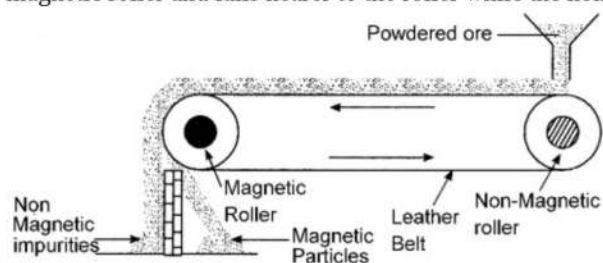
- Hydraulic washing: This method depends upon the difference in the densities of the ore particles and the impurities (gangue). The crushed and powdered ore is taken in large wooden tables with small obstacles. A stream of water is passed over the shaking table. The lighter impurities are washed away with the running stream of water while the heavier ore particles are left behind. This method of concentration is usually applicable to oxide ores.
- Froth floatation process: This method is used for the extraction of those metals in which the ore particles are preferentially wetted by oil and gangue by water. In this method, the powdered ore is mixed with water containing small quantities of oil (pine oil or eucalyptus oil) in a large tank (Fig.). The water is agitated by blowing air violently when a froth (or foam) is formed. The froth carries the lighter ore particles along with it to the surface. The heavier impurities are left behind in water and these settle to the bottom. Since the ore particles float with the froth at the surface, this process is called froth floatation process. The froth at the surface is transferred into another tank. The froth is broken by adding some acid and ore particles are separated by filtration and dried. For example, the froth floatation process is commonly used for the sulphide ores of copper, zinc, lead et



- Magnetic separation: The ores which are attracted by a magnet can be separated from the non-magnetic impurities with the help of magnetic separation method. For example, this method is used for the concentration of haematite, an ore of iron. It consists of a leather belt moving over two rollers, one of which is magnetic in nature. This is shown in the figure. The powdered ore is dropped over the moving belt at one end. At the other end, the magnetic portion of the ore is attracted by the



magnetic roller and falls nearer to the roller while the non-magnetic impurities fall farther off.



OR

i. Metals placed high in the reactivity series are extracted by electrolytic reduction.

While those in the middle are extracted first by converting into oxide and then reducing by carbon. The same method cannot be used because metals have more affinity for oxygen than carbon.

Molten sodium chloride is taken for electrolytic reduction. The metals are deposited at the cathode and chlorine is liberated at the anode.

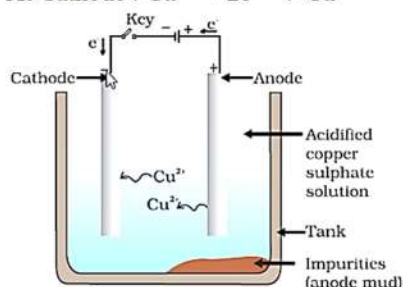
At cathode :  $\text{Na}^+ + \text{e}^- \rightarrow \text{Na}$

At anode :  $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$

ii. In the electrolytic refining of metal following reactions take place at the anode and cathode

At Anode :  $\text{Cu} \rightarrow \text{Cu}^{+2} + 2\text{e}^-$

At Cathode :  $\text{Cu}^{+2} + 2\text{e}^- \rightarrow \text{Cu}$



35. a. Excretion is the process of removing harmful metabolic waste such as urea, uric acid and salts from our body.

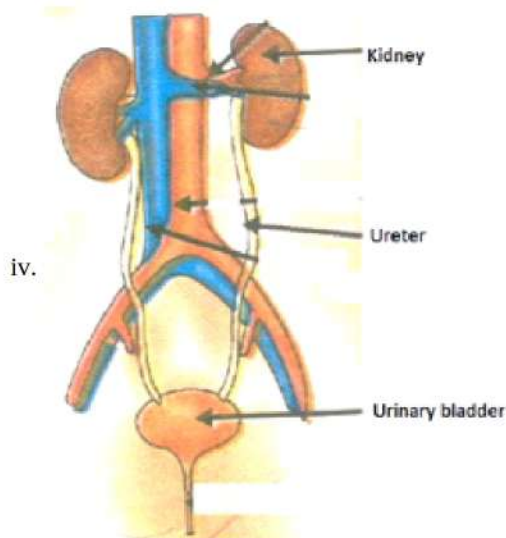
b. Nephron is the basic filtration unit present in the kidney.

c. Diagram of Human Excretory System is shown below.

i. kidney forms urine

ii. ureter is a long tube which collects urine from kidney.

iii. urinary bladder store urine until it is passed out.



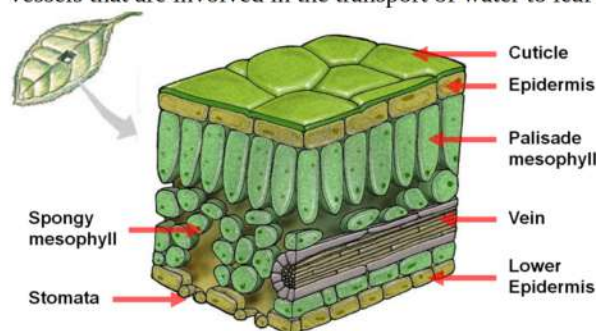
OR

The cross section of a typical leaf is divisible into three main parts namely, the epidermis, mesophyll, and the veins.

i. Epidermis: A typical leaf is made of several layers of cells that are sandwiched between two layers, called epidermis. The epidermal layer of a leaf protects the tissues which lie between them and also helps in the process of gaseous exchange.

Epidermis is further divisible into two types called, the upper epidermis and the lower epidermis.

- ii. Mesophyll: Mesophyll is a primary photosynthetic tissue of leaf which includes the palisade mesophyll and the spongy mesophyll.
- iii. Veins: Veins (also known as vascular bundle) provides the necessary support to the leaf and consists of xylem and phloem vessels that are involved in the transport of water to leaf and synthesized food to the rest of the plant structures respectively.



36. The activity to demonstrate that a current-carrying conductor experiences a force perpendicular to its length and the external magnetic field can be explained as follows:

**Activity:** To show the effect of magnetic field on a current-carrying conductor

**Materials Required:** For this, we need to take a small aluminum rod, a horseshoe magnet, battery, plug key, wires, and a stand.

- i. Suspend an aluminum rod horizontally from the stand and two wires at the ends of it are tied. The wires are connected to a Rheostat, battery and a key so that a circuit is completed,
- ii. Place a horseshoe magnet in such a manner that the aluminum rod is between the poles of a magnet.

Assume that the above the aluminum rod is South pole of the magnet and below, the north pole of the magnet. Insert the plug key and current is supplied to the rod.

**Observation:** the aluminum rod is deflected towards the left direction

On changing the direction of the current, the rod is deflection in the right direction.

Hence, it demonstrates that a current-carrying conductor experiences a force perpendicular to its length and the external magnetic field

The direction of the magnetic field can find out with the help of Fleming's left-hand rule. Let current is moving in an anticlockwise direction, then the direction of the magnetic field will be in clockwise direction i.e. at the top of the loop whereas vice-versa in case of the clockwise direction of the current.

#### Section E

37. Read the text carefully and answer the questions:

The electrical energy consumed by an electrical appliance is given by the product of its power rating and the time for which it is used. The SI unit of electrical energy is Joule. Actually, Joule represents a very small quantity of energy and therefore it is inconvenient to use where a large quantity of energy is involved. So for commercial purposes, we use a bigger unit of electrical energy which is called kilowatt-hour. 1 kilowatt-hour is equal to  $3.6 \times 10^6$  joules of electrical energy.

(i)  $E \propto t$

When the time of operating the heater is doubled, the energy dissipated is doubled.

(ii) Given:  $P = 60 \text{ W}$ ,  $t = 1 \text{ min}$

$$E = 60 \times 1 \times 60 = 3600 \text{ J}$$

OR

Given:  $P = 400 \text{ W}$ ,  $t = 8 \text{ hour}$

$$E = 400 \times 8 = 3200 \text{ Wh} = 3.2 \text{ kWh}$$

$$\text{Cost} = 3.2 \times 5 = ₹16$$

38. Read the text carefully and answer the questions:

Adrenaline is secreted directly into the blood and carried to different parts of the body. The target organs or the specific tissues on which it acts include the heart. As a result, the heart beats faster, resulting in the supply of more oxygen to our muscles. The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs. This diverts the blood to our skeletal muscles. The breathing rate also increases because of the contractions of the diaphragm and the rib muscles. All these responses together enable the animal body to be ready to deal with the situation. Such animal hormones are part of the



endocrine system which constitutes the second way of control and coordination in our body.



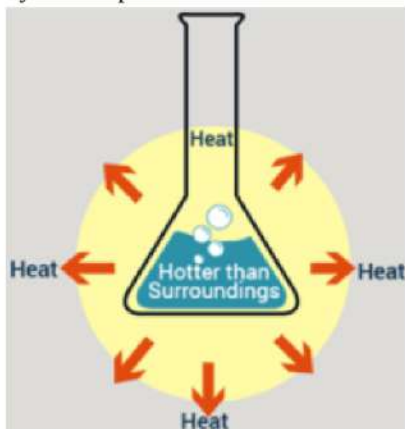
- (i) In animals, chemical coordination is achieved through the agency of hormones which function as chemical messengers. Different plant hormones help to coordinate growth, development, and responses to the environment.
- (ii) Adrenaline hormone is called an emergency hormone. Adrenaline hormone is released into the blood from the adrenal gland during stimulation of the nervous system.
- (iii) The adrenal gland is present on the upper side of each kidney in our body.

OR

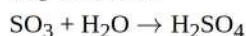
Adrenaline hormone is secreted in small amounts all the time. But in large amounts, it is secreted when a person is frightened. It increases the rate of heartbeat and breathing, raises blood pressure and allows more glucose go into the blood to give us a lot of energy so as to quickly fight or run away from the frightening situation.

**39. Read the text carefully and answer the questions:**

The dissolving of an acid or a base in water is a highly exothermic reaction. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets.



- (i) An exothermic reaction is a chemical reaction that releases energy through light or heat.
- (ii) Mixing of acid with water is a highly exothermic reaction.
- (iii) When sulphur trioxide (acidic oxide) is dissolved in water, an exothermic reaction takes place with the formation of sulphuric acid.



OR

Since the process of dissolving an acid in water is exothermic, it is always recommended that acid should be added to water. If it is done the other way, then it is possible that because of the large amount of heat generated, the mixture splashes out and causes burns.

