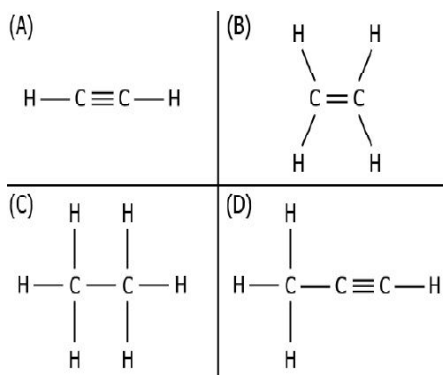


Section-A(Each 1 mark)

Select and write the most appropriate option out of the four options given for each of the questions 1 - 20. There is no negative mark for incorrect response.

1. The image represents the structure of a few hydrocarbon compounds.



Which of these compounds can be classified as alkynes?

Ans : c) Both (A) and (D)

2. When a non-metal is allowed to react with water:

Ans : d) No products are formed

3. Farmers neutralise the effect of Acidity on the soil by adding –

Ans : a) Slaked lime

4. The process in which a carbonate ore is heated strongly in the absence of air to convert it into metal oxide is called

Ans : c) Calcination

5. Which of the following is an endothermic process?

Ans : b) Sublimation of dry ice

6. Which of the following will undergo addition reactions?

Ans : d) C_2H_4

7. In thermite welding a mixture of and is ignited with a burning magnesium ribbon which produces molten iron metal as large amount of heat is evolved.

Ans : a) iron (III) oxide and aluminium powder

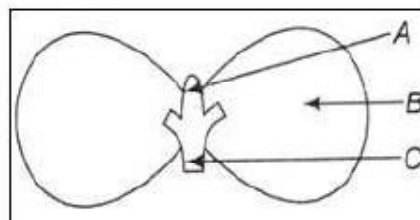
8. When a few drops of iodine solution are added to rice water, the solution turns blue- black in colour. This indicates that rice water contains:

Ans : c) starch

9. Posture and balance of the body is controlled by

Ans : c) Cerebellum

10. In the below figure, parts A, B and C are, sequentially,



Ans : c) Plumule, cotyledon and radicle

11. The secretion of which hormone leads to physical changes in the body when you are 10-12 years of age?

Ans : c) Testosterone from testes and estrogen from ovary.

12. Which part of nephron allows the selective reabsorption of useful substances like glucose, amino acids, salts and

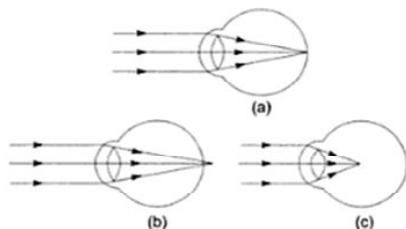
water into the blood capillaries?

Ans : a) Tubule

13. With both eyes open, a person's field of view is about:

Ans : c) 180°

14. Figure a, b, c respectively; indicate the point in case of:



Ans : c) The normal eye, the Hypermetropia eye and myopic eye

15. Which of the following constitutes a food chain?

Ans : a) Grass, goat and human

16. Mendel conducted his famous breeding experiments by working on the following:

Ans : c) Pisum Sativum

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason(R). Answer these questions selecting the appropriate option given below:

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

17. Assertion(A) : Electrovalency of Na is +1.

Reason(R): The number of electrons which an atom either loses or gains in the formation of an ionic bond is known as its valency.

Ans : a) Both A and R are true, and R is correct explanation of the assertion

18. Assertion(A): The four chambered heart does not mix oxygenated and deoxygenated blood.

Reason(R): Four chambered heart is found in mammals with advanced body functions.

Ans : b) Both A and R are true, but R is not the correct explanation of the assertion.

19. Assertion(A): Virtual images are always erect.

Reason (R) : Virtual images are formed by diverging lenses only.

Ans : c) A is true, but R is false.

20. Assertion(A) : Variations are seen in offspring produced by sexual reproduction.

Reason (R) : DNA molecule generated by replication is not exactly identical to original DNA.

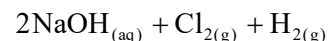
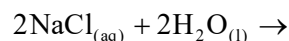
Ans : a) Both A and R are true, and R is the correct explanation of A.

Section-B (Each 2 marks)

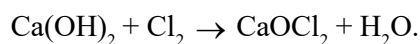
Question No. 21 to 26 are very short answer questions.

21. In one of the industrial processes used to manufacture sodium hydroxide, a gas X is formed as a byproduct. The gas X reacts with lime water to give a compound Y used as a bleaching agent in the chemical industry. Identify X and Y giving the chemical equation of the reactions involved.

Ans : Sodium chloride is used to manufacture sodium hydroxide, called the chloralkali process. In this process, chlorine and hydrogen gas are formed as byproducts and sodium hydroxide.



Chlorine gas gives bleaching power when it reacts with lime water and is used as a bleaching agent in chemical industries.



Therefore, the gas X is chlorine.

Compound Y is calcium oxychloride, commonly known as bleaching powder and is used as a bleaching agent in chemical industries.

22. a) How do Leishmania and Plasmodium reproduce?

b) State one difference in their mode of reproduction.

Ans : a) Leishmania and Plasmodium reproduce by fission (asexual mode of reproduction)

b) i) Leishmania reproduce by binary fission in which the parent organism splits to form two new organisms.

ii) Plasmodium reproduces by multiple fission in which the parent organism splits to form many new organisms at the same time.

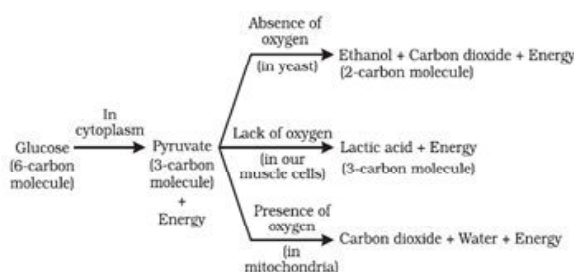
23. Diffusion is insufficient to meet the oxygen requirement of multicellular organisms like human. State reason.

Ans : Due to higher metabolic rate and the volume of human body is so large that oxygen cannot diffuse into all cells of the body quickly as oxygen will have to travel large distances to reach each and every cell. So diffusion is insufficient to meet the oxygen demand of multicellular organisms.

OR

Draw a flow chart to show the breakdown of glucose by various pathways.

Ans:



24. An object is placed perpendicular to the principal axis of a convex mirror of focal length 10 cm. The distance of the

object from the pole of the mirror is 10 cm. Find the position of the image formed.

Ans : Given, $f = +10$ cm (convex mirror) and $u = -10$ cm

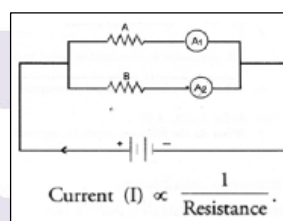
From mirror formula,

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u} \quad \text{or} \quad \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

$$\text{or} \quad \frac{1}{v} = \frac{1}{10} - \frac{1}{-10} = \frac{-10-10}{-100}$$

$$\therefore v = \frac{-100}{-20} = 5 \text{ cm behind the mirror.}$$

25. In the circuit diagram shown, the two resistance wires A and B are of the same length and same material, but A is thicker than B. Which ammeter A_1 or A_2 will indicate higher reading for current? Give reason.



Ans : The current will be high if resistance is low. p and l for both wires A & B are same but area of cross-section (A) of wire A is more than the wire B.

Therefore, the resistance of wire A is less than the resistance of wire B. Hence, ammeter A connected in series with the wire A will indicate higher reading for current.

OR

State how the magnetic field produced by a straight current carrying conductor at a point depends on

a) current through the conductor

b) distance of point from conductor.

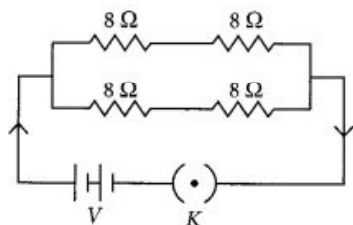
Ans : Strength of magnetic field produced by a straight current-carrying wire at a given point is

a) directly proportional to the current passing through it.

b) inversely proportional to the distance of that point from the wire.

26. You have four resistors of 8Ω each. Show how would you connect these resistors to have effective resistance of 8Ω ?

Ans : If you have four 8Ω resistors and the effective resistance is also 8Ω then the two 8Ω resistors are connected in series. Now you have pair of two 16Ω resistors ($8 \Omega + 8 \Omega$). If you connect these resistors in parallel, you will have net resistance 8Ω .



Section-C(Each 3 Marks)

Question No. 27 to 33 are short answer questions

27. A student prepared solutions of (i) an acid and (ii) a base in two separate beakers. She forgot to label the solutions, and litmus paper was not available in the laboratory. Since both the solutions are colourless, how will she distinguish between the two?

Ans : We can use phenolphthalein to check which beakers contain acid and which one contains a base. Phenolphthalein turns colourless in acidic solutions and pink in basic solutions.

Apart from that, we can also use other natural indicators, like China rose or turmeric.

Turmeric is a natural indicator. It is yellow coloured. Turmeric paper turns red when it is dipped into a basic solution while it does not change its colour with acid.

China rose is another natural indicator. China rose solution gives dark pink (magenta) colour with acid and green with base.

28. Write balanced chemical equations for the following chemical reactions:

a) Hydrogen + Chlorine \rightarrow Hydrogen chloride

b) Lead + Copper chloride \rightarrow Lead chloride + Copper

c) Zinc oxide + Carbon \rightarrow Zinc + Carbon monoxide

Ans : a) $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$
 b) $Pb_{(s)} + CuCl_{2(aq)} \rightarrow PbCl_{2(aq)} + Cu_{(s)}$
 c) $ZnO_{(s)} + C_{(s)} \rightarrow Zn_{(s)} + CO_{(g)}$

OR

Suggest a method of reduction for the following metals during their metallurgical processes:

i) metal 'A' which is one of the last, second or third position in the reactivity.

ii) metal 'B' which gives vigorous reaction even with water and air.

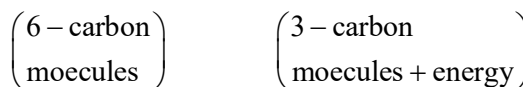
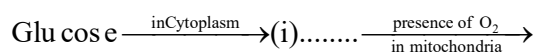
iii) metal 'C' which is kept in the middle of activity series.

Ans : i) 'A' can be obtained by chemical reduction using carbon or carbon monoxide as reducing agent.
 ii) 'B' can be obtained by electrolytic reduction.
 iii) 'C' can be reduced by reducing agent like 'Al'.

29. a) In the process of respiration, state the function of alveoli.

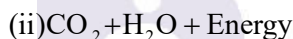
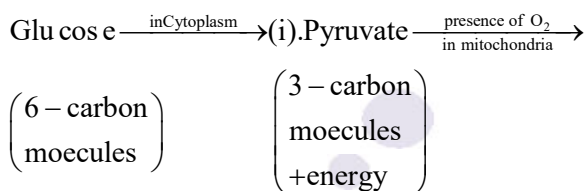
b) Rate of breathing in aquatic organisms is much faster than that in terrestrial organisms. Give reasons.

c) Complete the following pathway showing the breakdown of glucose.



Ans : a) **Functions of alveoli are :**

- i) They increase the surface area for exchange of gases.
 - ii) The thin walls of alveoli facilitate rapid exchange of oxygen and carbon dioxide between alveolar air and blood.
- b) Aquatic animals like fishes obtain oxygen from water present in the dissolved form through their gills. The amount of dissolved oxygen is quite small as compared to the amount of oxygen in the air. Therefore, to obtain required oxygen from water, aquatic animals have to breathe much faster than the terrestrial organisms.



30. Reproduction is essentially a phenomenon that is not for the survival of an individual but for the continuation of a species. Justify.

Ans : Organisms need energy for survival which they obtain from life processes such as nutrition and respiration.

Reproduction does not provide energy. It needs a lot of energy. Genetic material is transferred from one generation to the next as a result of reproduction through DNA copying.

DNA copying takes place with high constancy and considerable variations, which is advantageous to the species for stability in the changing environment.

31. The absolute refractive indices of glass and water are 1.5 and 1.33 respectively. In which medium does light travel faster? Calculate the ratio of speeds of light in the two media.

Ans : **Given :** refractive index of glass, $n_g = 1.5$

Refractive index of water, $n_w = 1.33$

Since, refractive index of medium,

$$n = \frac{\text{Speed of light in air}(c)}{\text{Speed of light in medium}(v)}$$

For glass $n_g = \frac{c}{v_g} \dots (i)$

For water $n_w = \frac{c}{v_w} \dots (ii)$

Since velocity of light in medium is inversely proportional to its refractive index, the light will travel faster in optically rarer medium i.e., water.

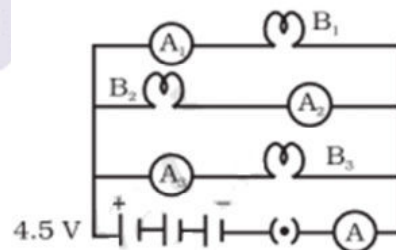
Dividing (i) by (ii),

$$\frac{n_g}{n_w} = \frac{v_w}{v_g} \quad \text{OR} \quad \frac{v_g}{v_w} = \frac{n_w}{n_g}$$

$$\frac{v_g}{v_w} = \frac{1.33}{1.5}$$

So, the ratio of v_g and v_w is 1.33 : 1.5.

32. B_1, B_2 and B_3 are three identical bulbs connected as shown in the figure below. When all the three bulbs glow, a current of 3A is recorded by the ammeter A



i) **What happens to the glow of the other two bulbs when bulb B_1 gets fused?**

ii) **What happens to the reading of A_1, A_2, A_3 and A when the bulb B_2 gets fused?**

iii) **How much power is dissipated in the circuit when all three bulbs glow together?**

Ans : i) The glow of bulbs B_2 and B_3 will remain

the same.

ii) A_1 shows 1 ampere, A_2 shows zero, A_3 shows 1 ampere, and A shows 2A.

iii) $P = VI = 4.5 \times 3 = 13.5 \text{ W}$

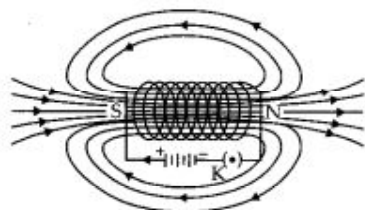
33. What is solenoid? Draw the pattern of magnetic field lines of

i) a current carrying solenoid and

ii) a bar magnet.

List two distinguishing features between the two fields.

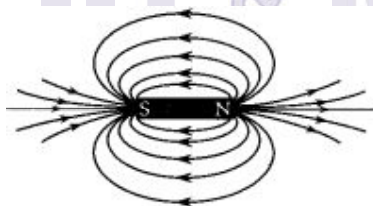
Ans : i) **Solenoid :** A coil of many circular turns of insulated copper wire wrapped in the shape of cylinder is called solenoid.



Field lines of the magnetic field through and around a current-carrying solenoid

The pattern of magnetic field lines inside the solenoid indicates that the magnetic field is the same at all points inside the solenoid. That is, the field is uniform inside the solenoid.

ii) Magnetic field lines around a bar magnet.



Following are the distinguishing features between the two fields.

a) A bar magnet is a permanent magnet whereas solenoid is an electromagnet, therefore field produced by solenoid is temporary and stay till current flows through it.

b) Magnetic field produced by solenoid is more stronger than magnetic field of a bar magnet.

Section-D(Each 5 Marks)

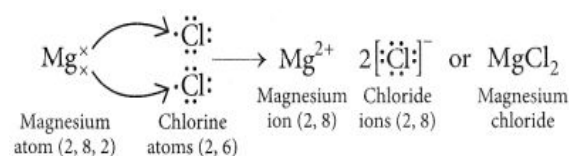
Question No. 34 to 36 are long answer questions.

34. i) By the transfer of electrons, illustrate the formation of bond in magnesium chloride and identify the ions present in this compound.

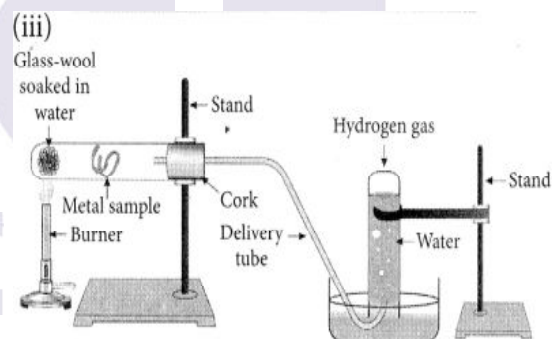
ii) Ionic compounds are solids. Give reasons.

iii) With the help of a labelled diagram show the experimental set up of action of steam on a metal.

Ans : i)



ii) Ionic compounds are solids because the particles which make up ionic compounds are held together by strong electrostatic bonds.



Action of steam on metal

OR

What is isomerism. Draw the structure for the following compounds:

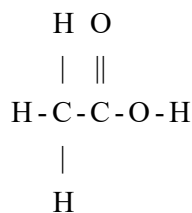
i) Ethanoic acid ii) Bromopentane

iii) Butane iv) Hexanal

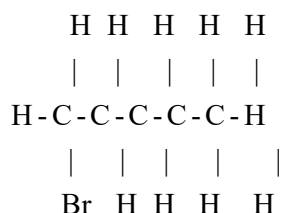
Ans : **Isomerism-**The compound having same molecular formula but different structural formula is called as isomerism.

Structure of compounds are given as under:

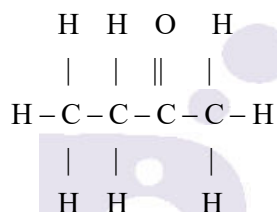
i) Ethanoic acid



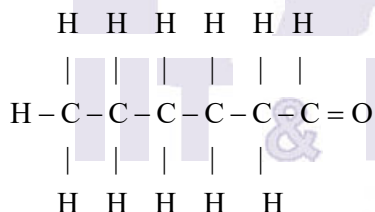
ii) Bromopentane



iii) Butanone



iv) Hexanal



35. a) Write two water conducting tissues present in plants. How does water enter continuously into the root xylem?

b) Explain why plants have low energy needs as compared to animals.

Ans : a) Xylem tracheids and vessels are two water conducting tissues present in plants that help in rapid movement of water. In xylem tissue, vessels and tracheids of the roots, stems and leaves are interconnected to form a continuous system of water conducting channels reaching all parts of the plant.

Minerals and water needed by the plants are absorbed by root hairs from the soil by the process of osmosis and take in minerals by the process of diffusion. Thus, a difference in concentration of ions is created between the roots and the soil which enables the water to enter into roots to compensate the difference in concentration. The water, along with dissolved minerals from root hairs, passes into xylem vessels through cells of the cortex, endodermis and pericycle and then ascent of sap (i.e., upward movement of water and mineral salts from roots to the aerial parts of the plant against the gravitational force) takes place from xylem of the roots to the xylem of stem and leaves through vessels and tracheids.

Evaporation of water molecules from the cells of leaves creates a suction pressure which pulls the water from xylem cells.

b) Plants are autotrophic and do not have to move from one place to another in search of their food. Movements in a plant are usually at the cellular level and hence they required less amount of energy.

Whereas animals are heterotrophic and locomote in search of food and other activities, hence require higher amount of energy than of plants.

OR

a) Name the organs that form the excretory system in human beings.

b) Describe in brief how urine is produced in human body.

Ans : a) Excretory system (Urinary system) in human beings consists of a pair of kidneys, a pair of ureters, urinary bladder and urethra.

b) In the kidney, the wastes are converted to urine by three processes :

i) Ultrafiltration : In it, large amount of water along with certain harmful substances like urea, uric acid, K^+ , ammonium salts, creatinine, etc., and certain useful substances like glucose, amino acids, Na^+ , etc., pass through glomerular capillaries and

glomerular membrane into cavity of Bowman's capsule of nephrons under pressure. The filtrate so formed is called nephric filtrate which is moved towards ureter.

ii) Selective reabsorption : In it, large amount of water and sodium, whole of glucose and amino acids and small amount of urea are passed back from nephric filtrate into blood capillaries. It occurs either by back diffusion (i.e., water and urea) or active transport (i.e., Na^+ , glucose and amino acids). It generally occurs in PCT (Proximal convoluted tubule) of nephrons.

iii) Tubular secretion : In this, certain harmful chemicals like uric acid, creatinine, K^+ , etc., are passed from blood capillaries surrounding the nephron into nephric filtrate by active transport. It generally occurs in DCT (Distal convoluted tubule) of nephrons. Now, the fluid is termed as urine and is excreted out of the excretory organs.

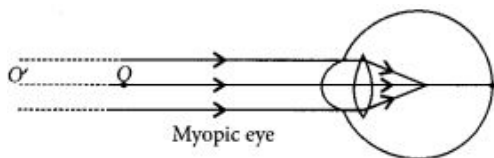
36. A student is unable to see clearly the words written on the black board placed at a distance of approximately 3 m from him. Name the defect of vision the boy is suffering from. State the possible causes of this defect and explain the method of correcting it.

Ans : Student is suffering from myopia.

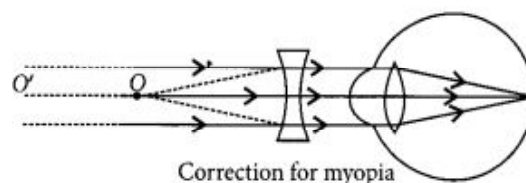
The two possible reasons due to which the defect of vision arises are :

excessive curvature of the eye lens and elongation of the eye ball.

A student with myopia has the far point nearer than infinity, thus, the image of a distant object is formed in front of the retina.



Correction of myopia: This defect can be corrected by using a concave lens of suitable power as it brings the image back on to the retina, thus the defect is corrected.



OR

Name the three common defects of vision. What are their causes? Name the type of lens used to correct each of them.

Ans : Three common defects of vision are Myopia

Hypermetropia

Presbyopia

Myopia can be caused due to following reasons.

- i) Elongation of eyeball.
- ii) Excessive curvature of eye lens.

Hypermetropia can be caused due to following reasons.

- i) Shortening of eyeball.
- ii) Focal length of eye lens becomes too long.

Presbyopia is caused due to gradual weakening of ciliary muscles and diminishing flexibility of eye lens due to ageing.

Correction of these defects:

- i) Myopia can be corrected by using concave lens of appropriate focal length.
- ii) Hypermetropia can be corrected by using convex lens of appropriate focal length.
- iii) Presbyopia can be corrected by using bifocal lens

SECTION - E (Each 4 marks)

Question No. 37 to 39 are case-based/data - based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. Read the following paragraph and answer the following question

When fats and oils are oxidized, they become.....down oxidation.

i) What do you mean by the word rancidity? 1

Ans : The spoiling of food due to oxidation of fats and oils present in the food material

ii) Write any three methods to prevent rancidity. 2

Ans : Three methods to prevent rancidity of food includes:

- A) Salting
- B) Adding preservatives like vinegar
- C) Storing in air tight containers.

OR

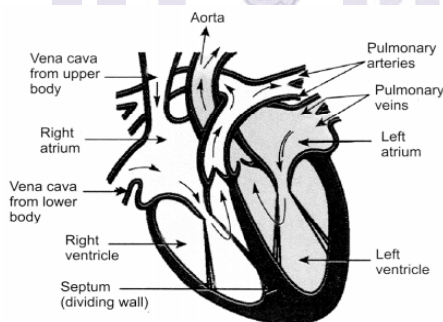
What is the meaning of antioxidants. Give an example.

Ans : The type of substances which can prevent the oxidation process of certain food materials are called as antioxidants. Some natural antioxidants are vitamin -c, selenium etc.

iii. Which gas is filled in the chips packets to keep them crunchy? 1

Ans : The gas filled in chips packets is nitrogen gas which can keep the chips crunchy.

38. Observe the figure and answer the following questions.



i) Name the part which receives deoxygenated blood from vena cava. 1

Ans : Right atrium

ii) Name the part which sends deoxygenated blood to lung through pulmonary artery 1

Ans : right ventricle

iii. Define double circulation 2

Ans : In humans, blood passes through the heart twice during a cardiac cycle. Once, the deoxygenated blood passes through the heart and then the oxygenated blood passes through the heart. This is called double circulation.

OR

a) Which vein carry oxygenated blood?

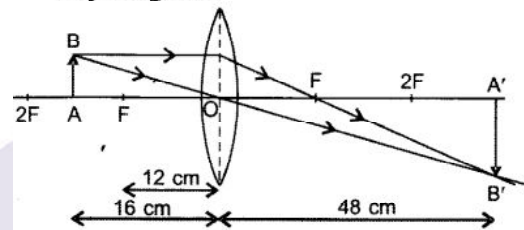
Ans : Pulmonary vein

b) Write the fuction of capillary.

Ans : Exchange of materials between blood and surrounding cells take plcce in the capillaries.

39. Observe the figure and answer the following question

Ray diagram:



i) What is the position of the object? 1

Ans : Between F and 2F

ii) What is the position of the image? 1

Ans : Beyond 2F

iii) What is the nature of the image? What is the difference between real and virtual image? 2

Ans : Real and inverted

Difference between real and virtual image

The image which form on the screen is called as the real image.

The image which is not form on the screen is called as the virtual image.

OR

What is the focus in convex lens?

Ans : This point where the parallel set of incident rays meet at a point after refraction is called the principal focus of a convex lens.

* * *