

BIOLOGY

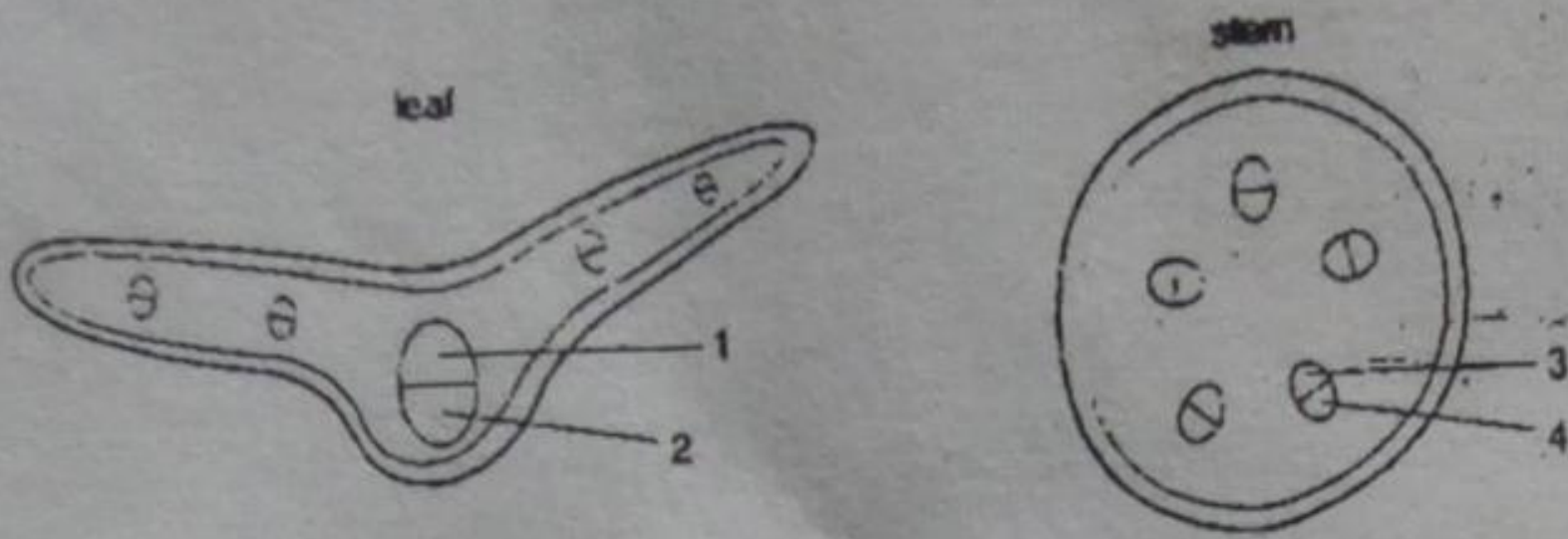
REVISION EXAMINATION QUESTIONS WITH ANSWERS

10-12



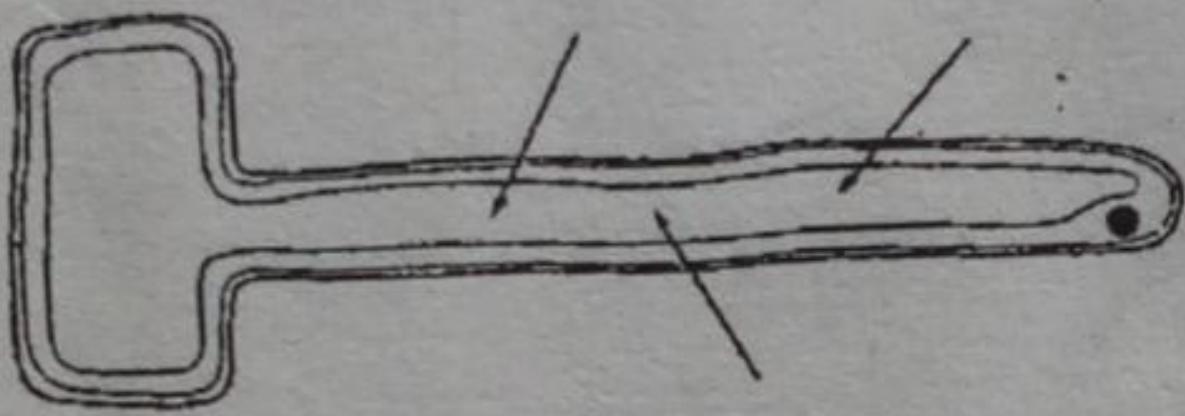
Cells

1. The diagram shows sections of a leaf and of a plant. Which regions represent phloem tissues? D



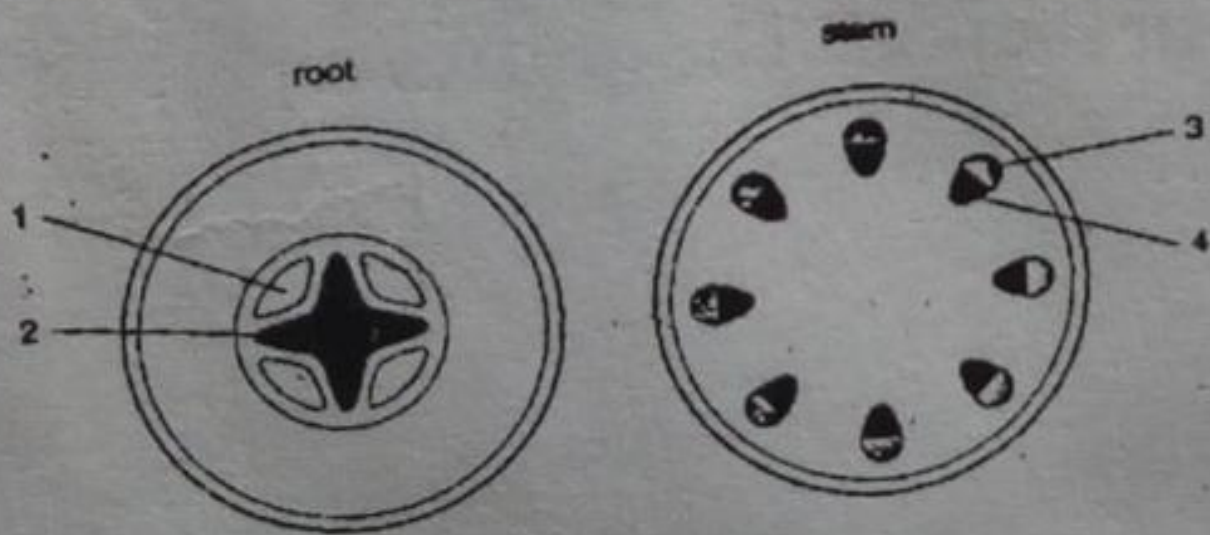
	Leaf	Stem
A	1	3
B	1	4
C	2	3
D	2	4

2. The diagram shows the movement of a substance into a plant cell. Which substance moves by active transport in the direction of the arrows? B



- A. Glucose
- B. Nitrates
- C. Oxygen
- D. Water

3. The diagram shows sections from the root and stem of a plant. Which tissues carry amino acids in solution? C



	Root	Stem
A	1	3
B	1	4
C	2	3
D	2	4

4. Some feature of plant leaves are listed.
- 1. Hairs on lower surface
 - 2. Large surface area
 - 3. Waxy cuticle

Which features reduce water loss from the leaves?

B

- A. 1 and 2 only
- B. 1 and 3 only
- C. 1, 2 and 3
- D. 2 and 3 only

What are the functions of phloem and xylem in a green plant?

D

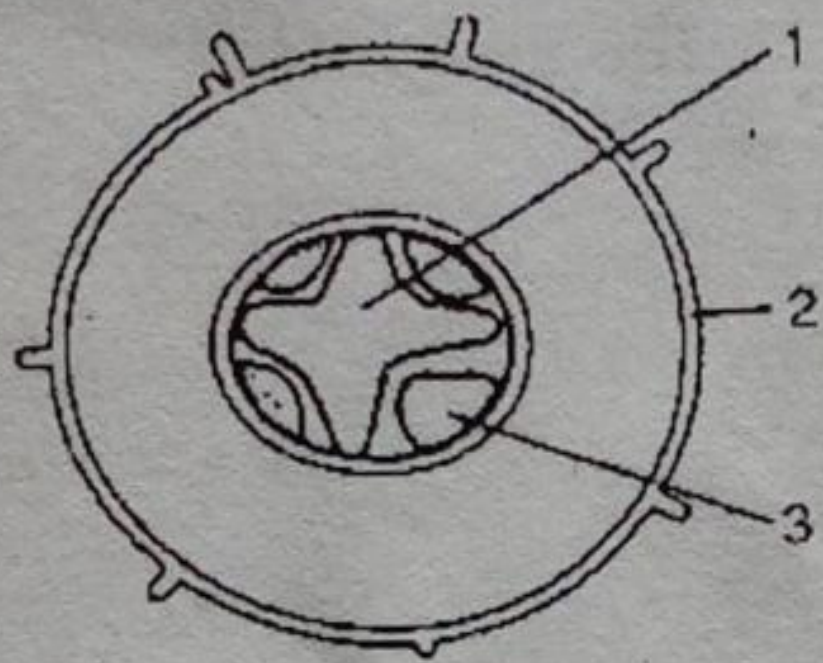
Phloem

- A. Support and transport of sugars
- B. Support and transport of water
- C. Transport of sugars
- D. Transport of water

Xylem

- transport of water
- transport of sugars
- support and transport of water
- support and transport of sugars

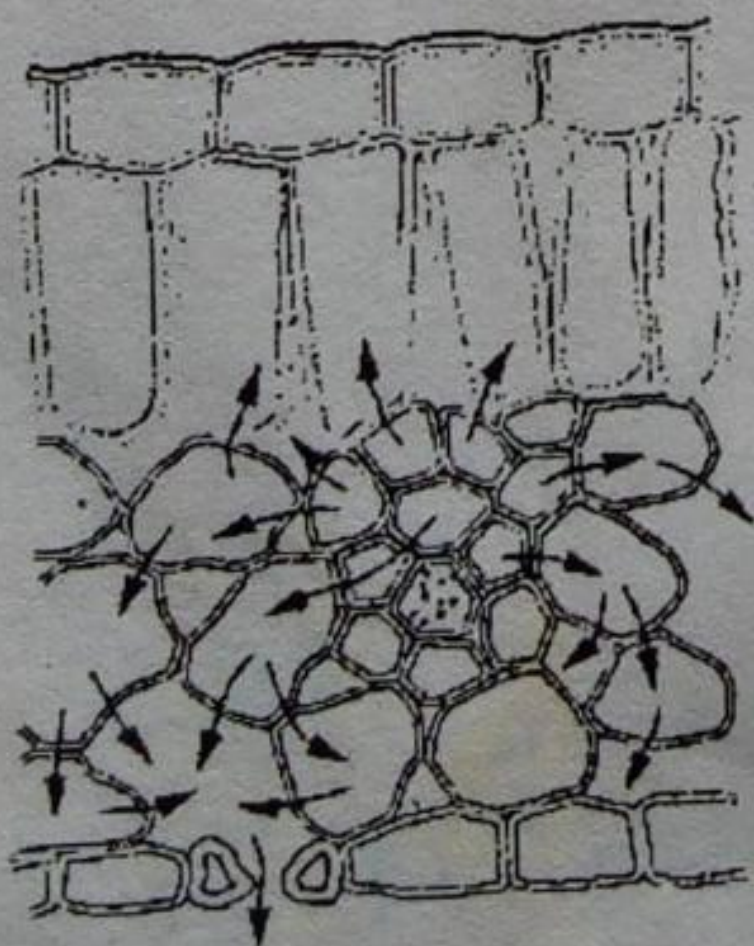
The diagram shows the tissues in a section of the root of a green plant. What are the numbered tissues?



	Epidermis	Phloem	Xylem
A.	1	2	3
B.	1	3	2
C.	2	1	3
D.	2	3	1

D

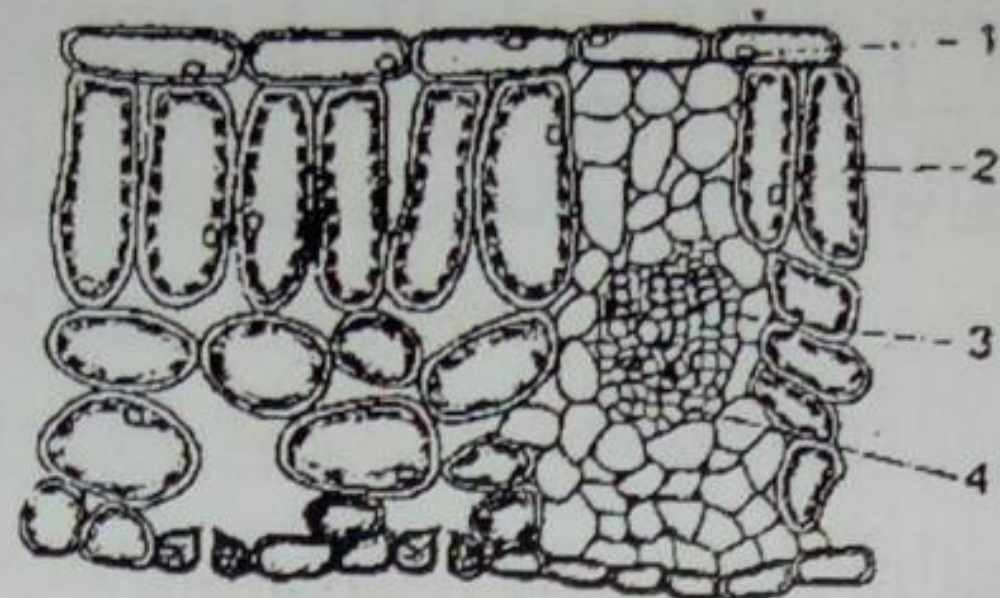
7. The diagram shows part of a green leaf in section. The arrows represent the movement of



- A. Carbon dioxide during respiration
- B. Oxygen during photosynthesis
- C. Sugars during photosynthesis
- D. Water during transpiration

D

8. The diagram shows the arrangement of cells in a leaf. Which cells are specialized for photosynthesis and for transport of water?



Photosynthesis

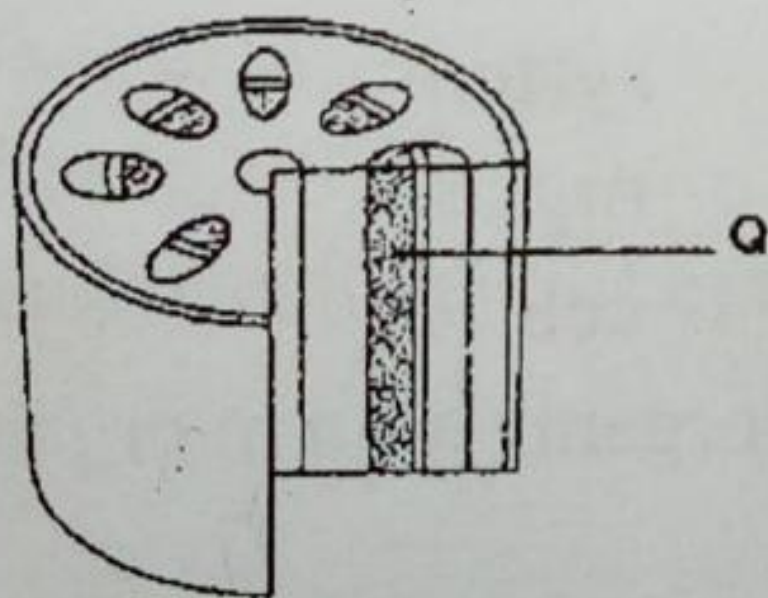
Transport of water

- | | | | |
|----|---|---|---|
| A. | 1 | 3 | |
| B. | 1 | 4 | |
| C. | 2 | 3 | D |
| D. | 2 | 4 | |

9. Which conditions would cause a plant to wilt most rapidly?

- | | Humidity | Temperature | Wind speed | |
|----|----------|-------------|------------|---|
| A. | High | high | high | |
| B. | High | high | low | |
| C. | Low | high | high | C |
| D. | Low | low | low | |

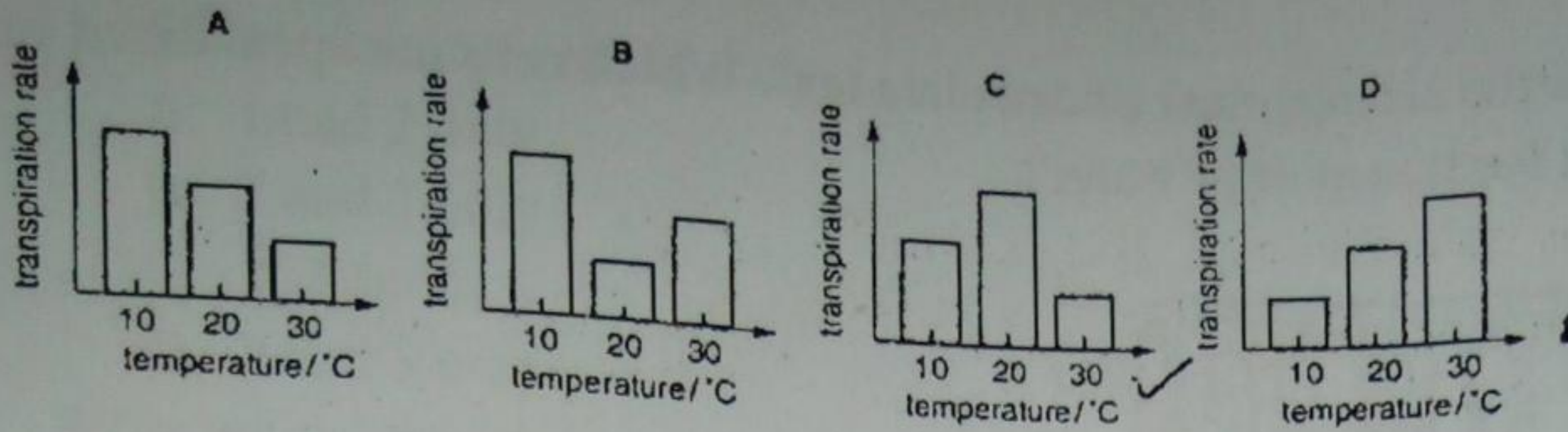
10. The diagram shows a section through a stem. What is the main transport function of tissue Q?



- | | Substance transport | Carried from | Carried to |
|----|---------------------|--------------|------------|
| A. | Sugar | roots | leaves |
| B. | Sugar | leaves | roots |
| C. | Water | roots | leaves |
| D. | Water | leaves | roots |

11. The transpiration rates of well-watered plants were measured at 10°C, 20°C and 30°C. Which bar chart shows the results obtained?

C



12. Which pair of terms correctly describes the processes mentioned?

Formation of bile the liver

Shoots rowing towards light

A. Digestion

irritability

B. Excretion

irritability

C. Deamination

excretion

D. Digestion

phototropism

D

13. Which of the following organelles are present in large concentration in the palisade cell and muscle cells?

Palisade cell

Muscle cell]

A. Ribosomes

chloroplasts

B. Endoplasmic reticulum

golgi bodies

C. Chloroplasts

mitochondria

D. Vacuoles

ribosomes

C

14. What level of cell organization does each of the following structures belong to?

Neurone

Blood

Bone

A. Cell

tissue

tissue

B. Tissue

organ

system

C. Organ

cell

organ

D. Organism

system

cell

A

15. Which letter shows the correct sequence of cell organization in organisms, starting from the simplest to the most complex structure?

A. Cell, organelle, tissue, system, organ

B. Tissue, cell, organ, system, organism

C. Organelle, cell, tissue, system

D. Organ, organelle, cell, tissue, system

C

16. Where does the human body have ciliated cells?

A. Nostrils and lungs

B. Bronchi and oviducts

C. Ovaries and bronchioles

D. Diaphragm and oviducts

A

17. Which adaptation makes the red blood cells capable of attracting oxygen?

A. Biconcave disc shape

B. Presence of hemoglobin

C. Absence of nucleus

D. They are numerous

B

18. What two cells have no nuclei when fully mature?

A. Xylem and red blood cell

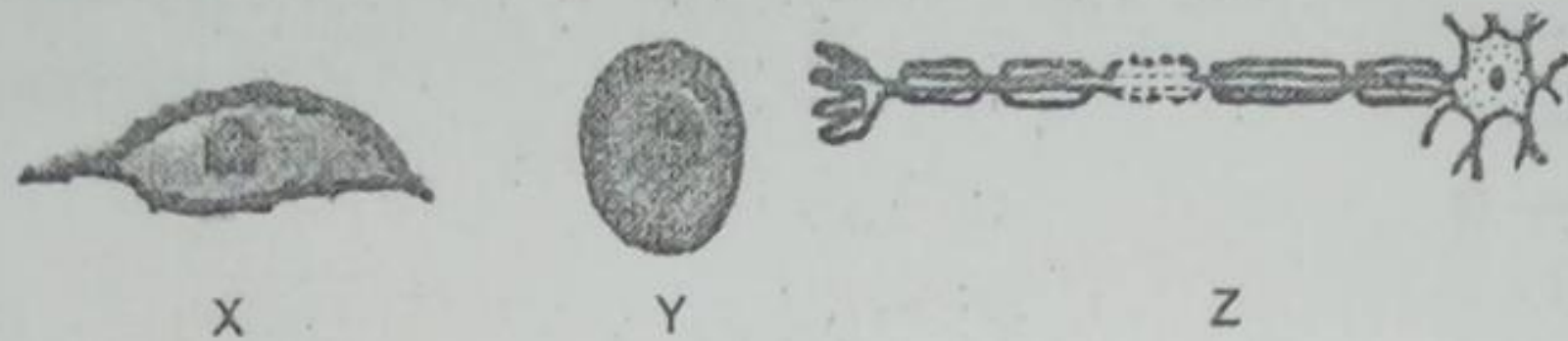
B. Phloem and red blood cell

C. Phloem and root hair cell

D. Xylem and root cell

A

19. The diagram below shows three specialized cells found in a human being.



Match the three cells with the tissues where they are found.

Cell X

Cell Y

Cell Z

A. Blood

Nerve

Muscle

B. Muscle

Blood

Nerve

C. Nerve

Muscle

Blood

D. Muscle

Nerve

Blood

B

20. What structures help root hair cells to take up water?

A. Contractile fibres

B. Thick outer wall

C. Large surface area

D. Cell membrane

C

21. What is the main constituent of cytoplasm?

A. Sap

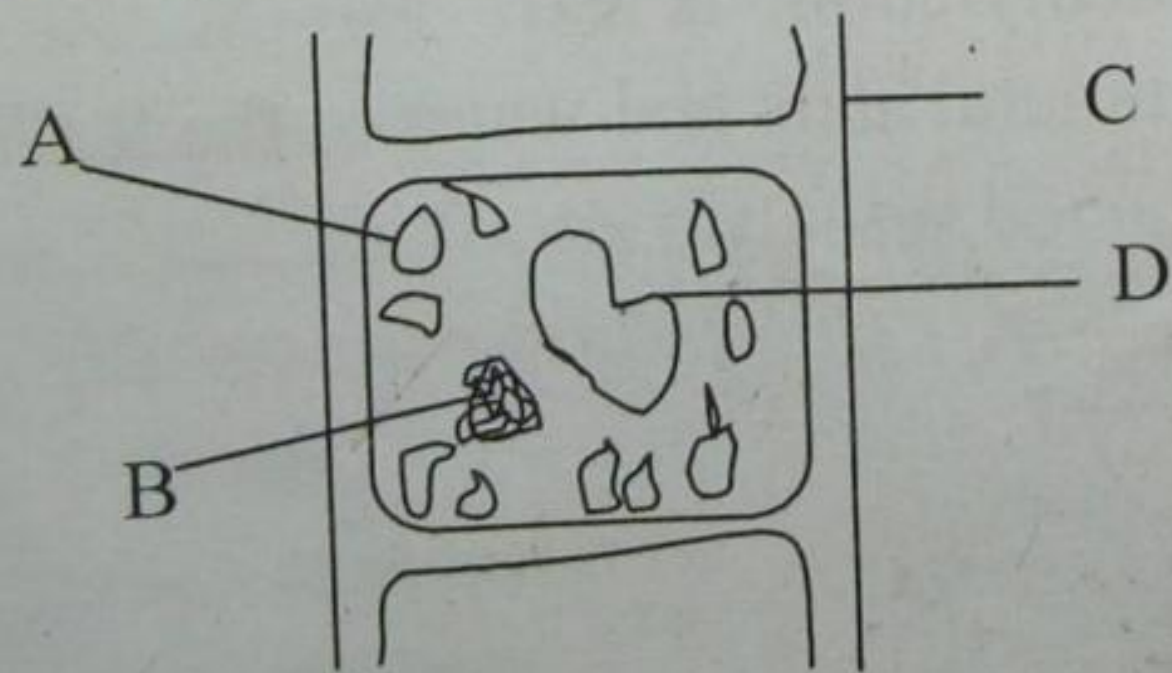
B. Salt

C. Water

D. Pigments

C

22. The diagram below shows a plant cell



A

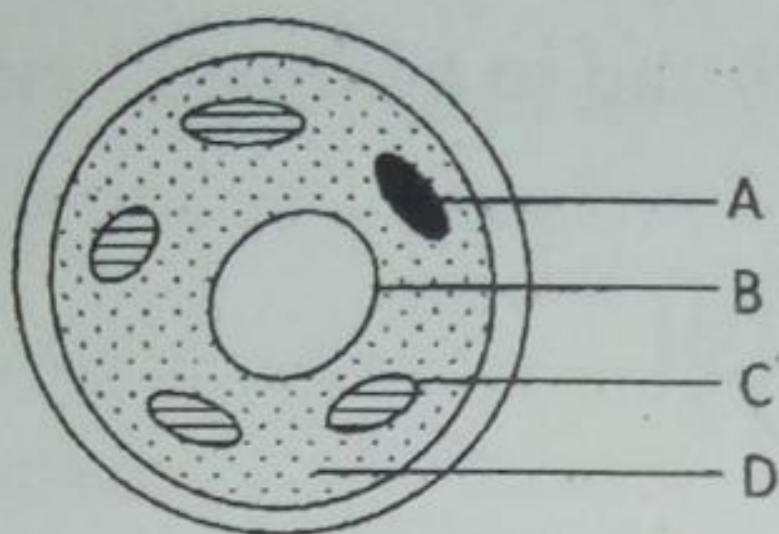
Which of these structures A, B, C and D is responsible for conversion of light energy to chemical energy?

23. Which of the following statements is true for animal cells.

- A. Presence of cell wall
- B. Presence of chloroplast
- C. Absence of cell membrane
- D. Absence of chlorophyll

B

24. The diagram shows a cell taken from a green healthy plant.



Which of the labeled structures A, B, C and D is responsible for glucose synthesis?

D

6. How permeable are the cell wall and the cell membrane in a plant cell?

	Cell Wall	Cell membrane
A	Fully	Fully
B	Fully	Partly
C	Partly	Fully
D	Partly	Partly

B

7. Cell functions are managed by the

- A. Mitochondria
- B. Ribosomes
- C. Lysosomes
- D. Nucleus

D

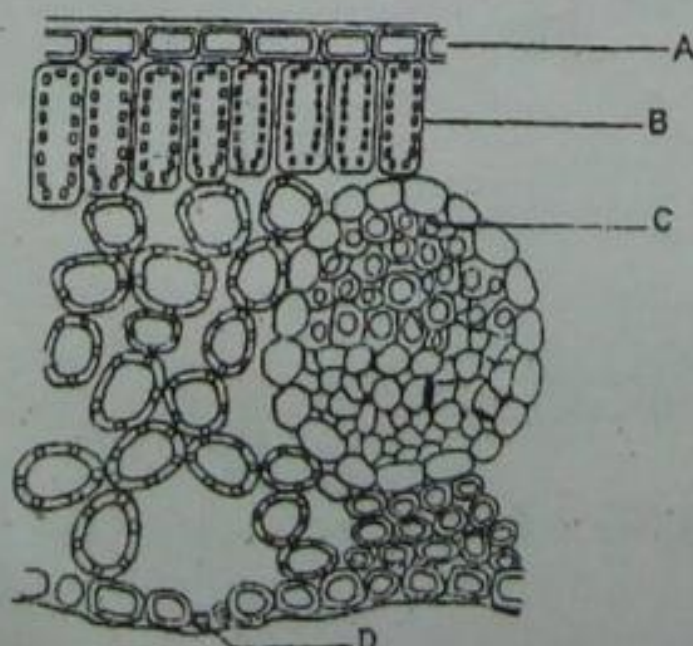
8. Which of the following pairs of terms is not related?

- A. Nucleus ---DNA
- B. Chloroplast --- Chlorophyll
- C. Flagella --- Chromatin
- D. Cell wall --- Cellulose

C

9. Diagram below shows the internal structure of a dicotyledonous leaf.

Which labeled part plays a role in conducting of mineral salts and water to the leaf?



10 A group of cells that work together to perform an activity is called?

- A. Unicellular
- B. Tissue
- C. An organ
- D. An organ system

C

B

Which structure A, B, C, or D, controls the substances that enter or leave the cell?

11. What structure covers the outside of the fungal cell?

- A. Plasma membrane
- B. Mitochondria
- C. Cilia
- D. Cell wall

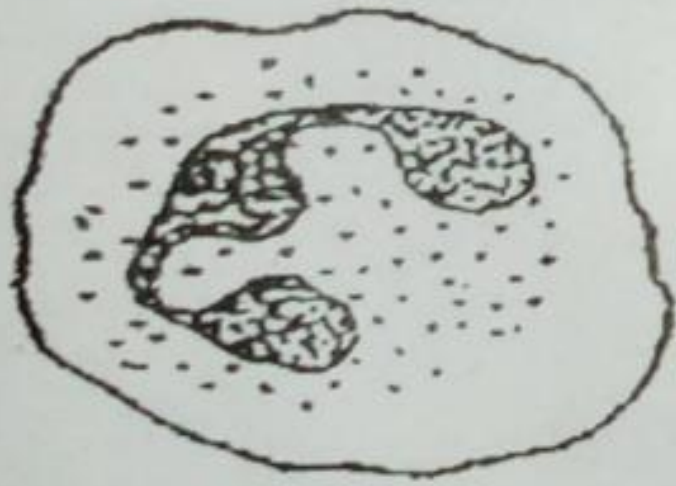
C

12. Which of the following structures is composed of DNA?

- A. Ribosomes
- B. Golgi apparatus
- C. Chromatin
- D. Vacuole

B

13. Identify this cell and indicate where it is found.



- A. Lymphocyte in blood
- B. Phagocyte in blood
- C. Phagocyte in plant cell
- D. Red blood cell in blood

A

14. Which of the following structures is NOT found in both plant and animal cell?

- A. Chloroplast
- B. Cytoskeleton
- C. Ribosomes
- D. Mitochondria

A

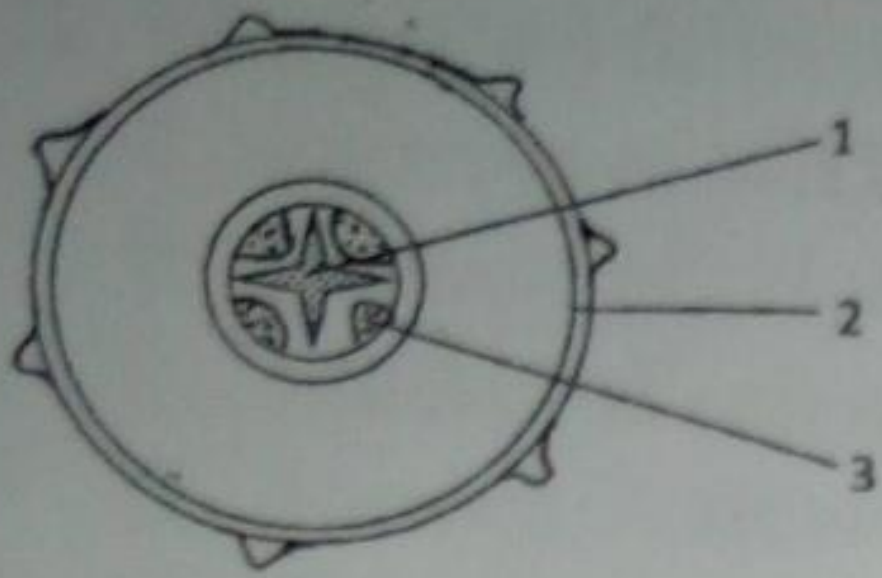
15. The _____ forms the outer boundary of an animal cell.

- A. Plasma membrane
- B. Cell wall
- C. Nuclear membrane
- D. Cytoskeleton

A

16. The diagram below shows the tissue in a section of a green plant. What are the numbered tissues?

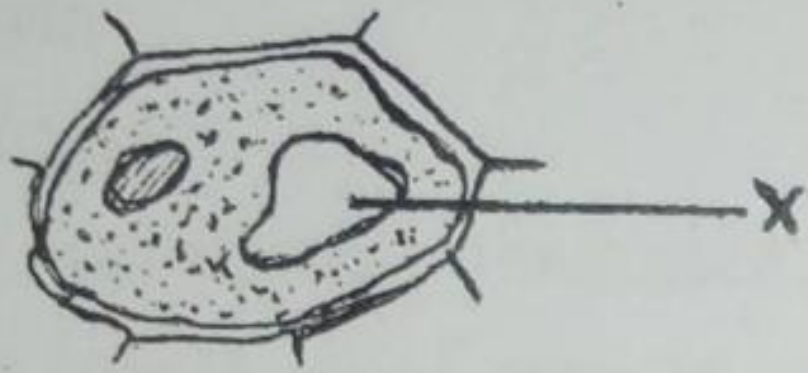
C



	Epidermis	Phloem	Xylem
A			
B			
C			
D			

17. In an amoeba, which structure digests food in a vacuole by releasing enzymes?
 A. Golgi apparatus
 B. Endoplasmic reticulum
 C. Lysosomes
 D. Mitochondria B
18. A _____ is an organism with a cell that lack membrane-bound organelles.
 A. Eukaryote
 B. Prokaryote
 C. Nucleolus
 D. Chromatin B
19. Protein assembly in a cell takes place in the
 A. Nucleus
 B. Mitochondria
 C. Vacuoles
 D. Cytoplasm D
20. What is the function of guard cell?
 A. Allows oxygen to enter leaves
 B. Prevents loss of water and oxygen from leaves
 C. Closes stomata when it is too windy and very hot
 D. Regulates the size of stomata C
21. Where does glycolysis occur in the cell?
 A. Inside the endoplasmic reticulum
 B. Inside the mitochondria
 C. In the cytoplasm
 D. Outside of the cell C
22. The main structural component(s) of the plasma membrane is (are)
 A. Carbohydrates
 B. Cholesterol

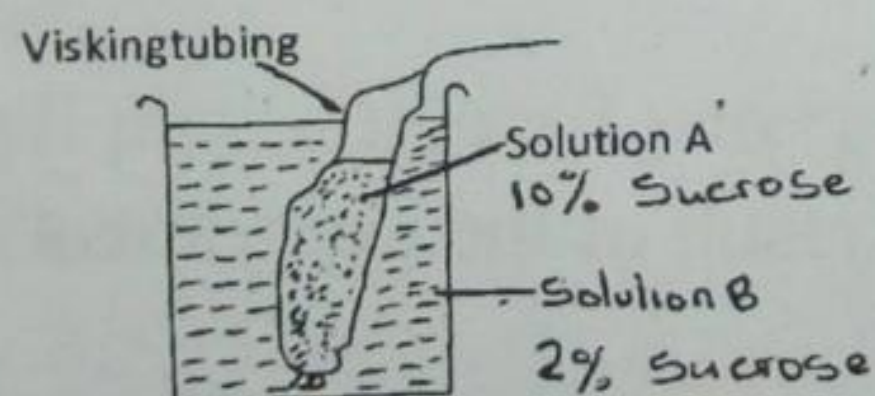
- D. Proteins
23. The _____ is made up of a bilayer of lipid molecules.
- A. Nuclear wall
 - B. Plasma membrane
 - C. Cell wall
 - D. Cytoskeleton
24. Of these, which does NOT have a membrane with a fluid mosaic bilayer structure?
- A. Nucleus
 - B. Mitochondria
 - C. Chloroplast
 - D. Cytoskeleton
25. The structure marked X in the diagram of the plant cell is



- A. Cytoplasm
- B. Cell membrane
- C. Cell wall
- D. Vacuole

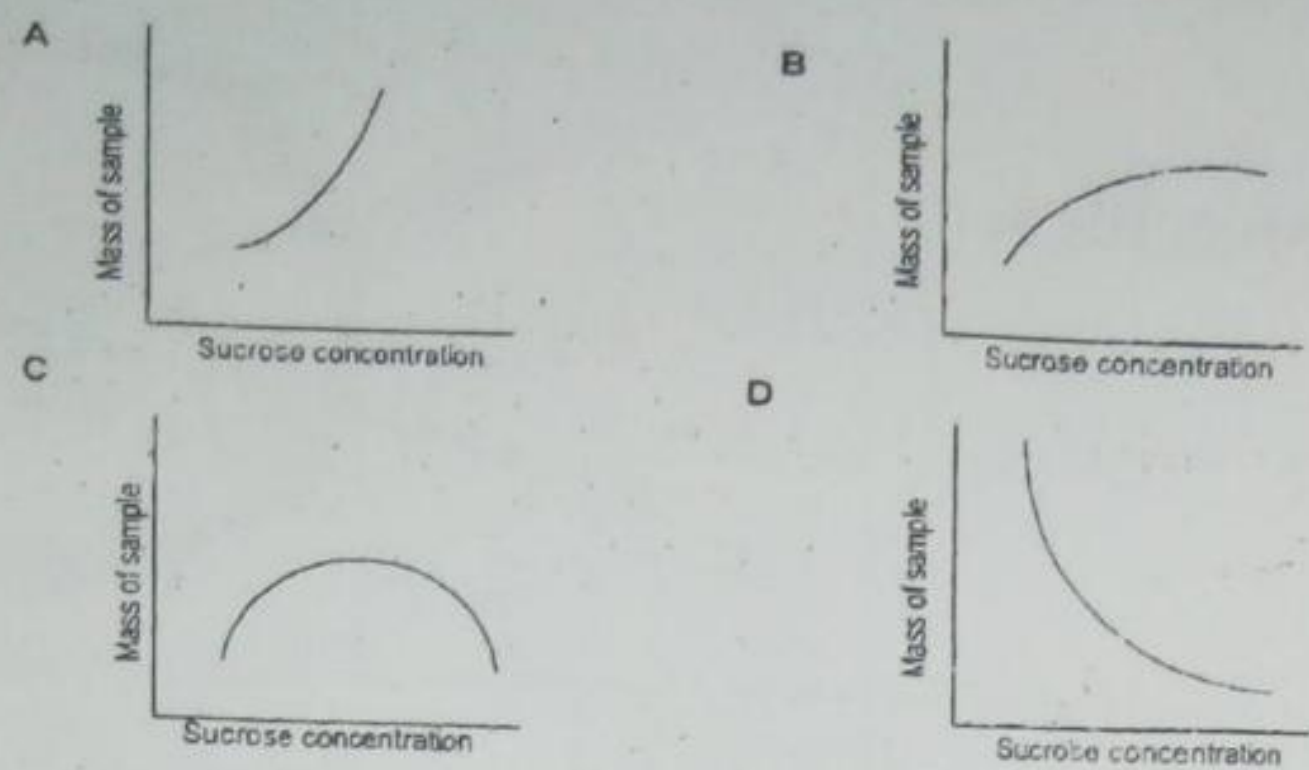
Diffusion/Osmosis

1. The diagram shows an experiment to investigate osmosis.



Which of the following changes would occur if the experiment was let to stand for one hour?

- A. The volume of solution A would increase
 - B. The volume of solution A would decrease
 - C. The concentration of solution A would remain the same
 - D. The concentration of solution B would remain the same
2. Samples of potato tuber were placed in sucrose solutions of different concentrations. Any changes in the mass of samples were noted. Select the graph that shows the results of the experiment..



3. Which of the following is not a mechanism of passive transport?

- A. Direct diffusion
- B. Diffusion through protein channels
- C. Active transport
- D. Transport by carrier proteins

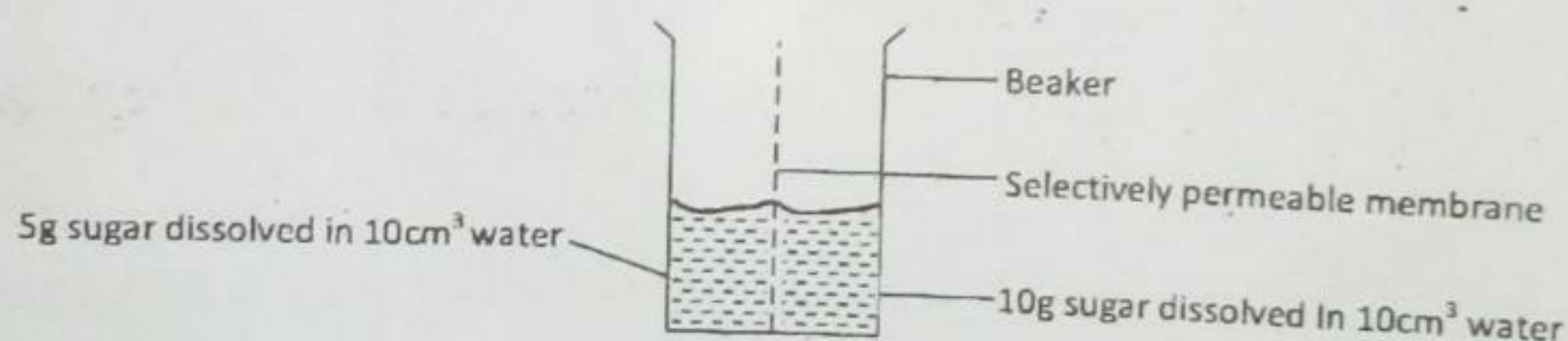
D

4. Of these, which does NOT have a membrane with a fluid mosaic bilayer structure?

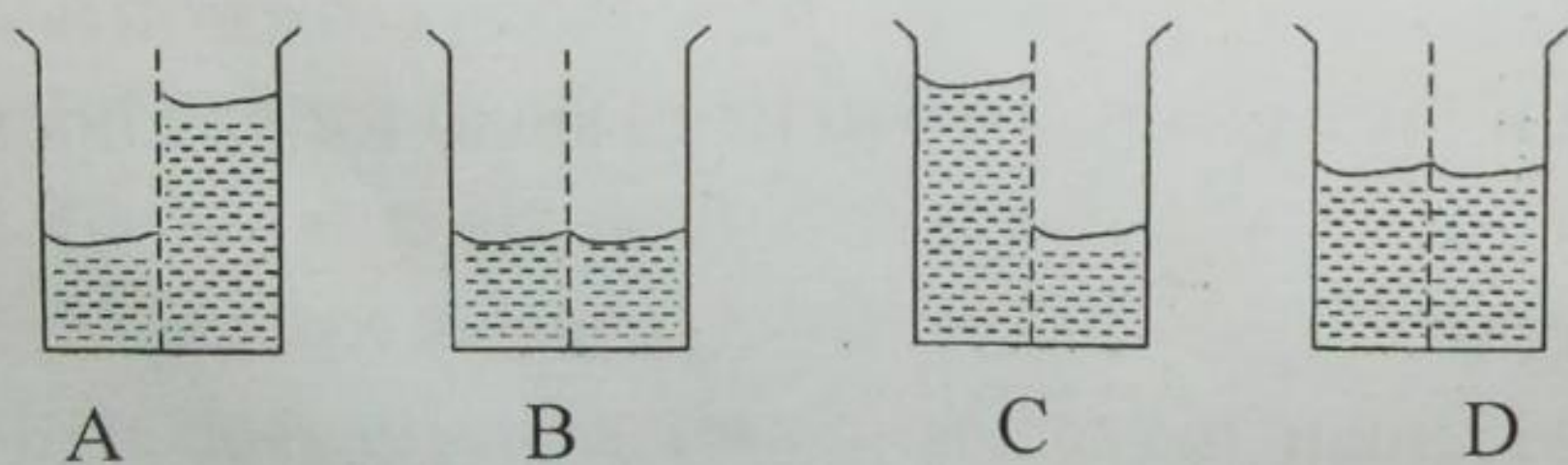
- A. Nucleus
- B. Mitochondria
- C. Chloroplast
- D. Cytoskeleton

B

5. The different concentrated sugar solutions are put in a beaker and are separated by a selectively permeable membrane as shown below.



Which of the following beakers shows the correct end result of the experiment?



6. When the concentration of solutes inside the cell is equal to the concentration outside the cell, the solution is said to be

A

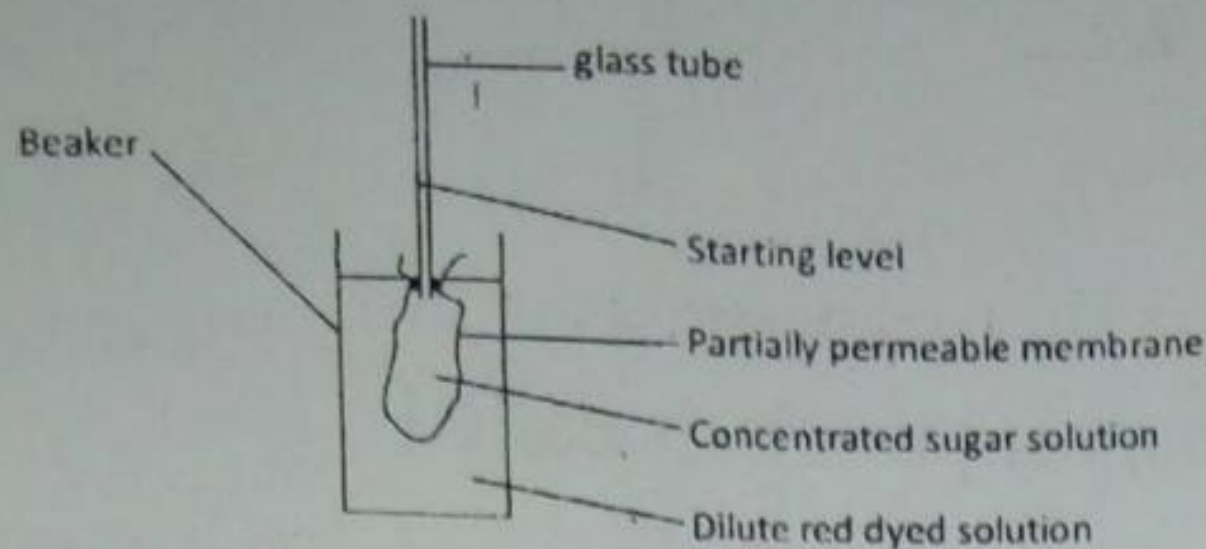
- A. Hypertonic
- B. Hypotonic
- C. Isotonic
- D. Contractile

C

7. An amoeba ingests large food particles by

- A. Osmosis

- B. Diffusion
C. Endocytosis
D. Exocytosis
8. The type of diffusion that occurs through transport protein is called
A. Dynamic movement
B. Osmotic movement
C. Facilitated diffusion
D. Active transport
9. _____ is the net movement of particles from an area of higher concentration to an area of lower concentration.
A. Active transport
B. Plasmolysis
C. Diffusion
D. Exocytosis
10. In plasma membrane, cholesterol
A. Allows insertion of protein
B. Allows diffusion of nonpolar substances
C. Binds to carrier proteins
D. Makes the membrane more stable and less fluid
11. A _____ membrane allows some materials to pass through while keeping others out.
A. Saturated
B. Selectively permeable
C. Trilayer
D. Homeostatic
12. A red blood cell placed into a 3 percent salt solution will
A. Swell, then burst
B. Shrink
C. Maintain its normal shape
D. Shrink, and then swell back to normal
13. A membrane that has more fluid would contain more
A. Unsaturated fatty acids
B. Saturated fatty acids
C. Cholesterol
D. Protein
14. The diagram shows an arrangement of an experiment. At the start of the experiment, the glass tube contained a clear concentrated sucrose solution.



After a few hours, the level in the glass tube rose and its contents changed to red.

Which matched pair of processes represents these changes correctly.

Level rising

Contents changing to red

- | | |
|--------------|-----------|
| A. Osmosis | Osmosis |
| B. Diffusion | Diffusion |
| C. Diffusion | Osmosis |
| D. Osmosis | Diffusion |

D

15. What is responsible for Brownian motion?

- A. Fluid movement of the phosphor lipid molecules
- B. The plasma membrane surrounds a food particle
- C. The random movement of molecules
- D. Movement of molecules against the concentration gradient

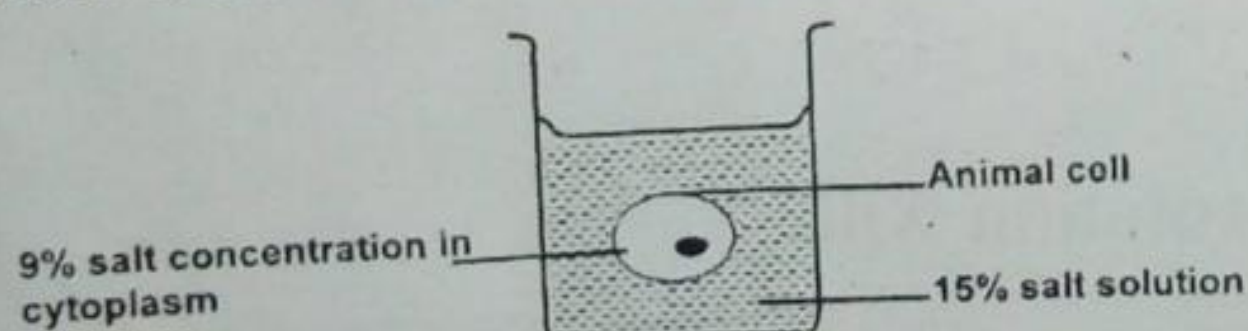
C

16. Which of the following is NOT a function of membrane proteins?

- A. Act as membrane carrier molecules
- B. Energy storage for the cell
- C. Act as markers for recognition
- D. Form channel molecules

B

17. The diagram below shows an animal cell placed in 15% salt solution.



What would happen to the cell after several hours?

- A. Expands and bursts open
- B. Becomes crenated
- C. Gains the salt from surrounding solution
- D. Loses the salt to surrounding solution

B

18. What is the eventual result of diffusion?

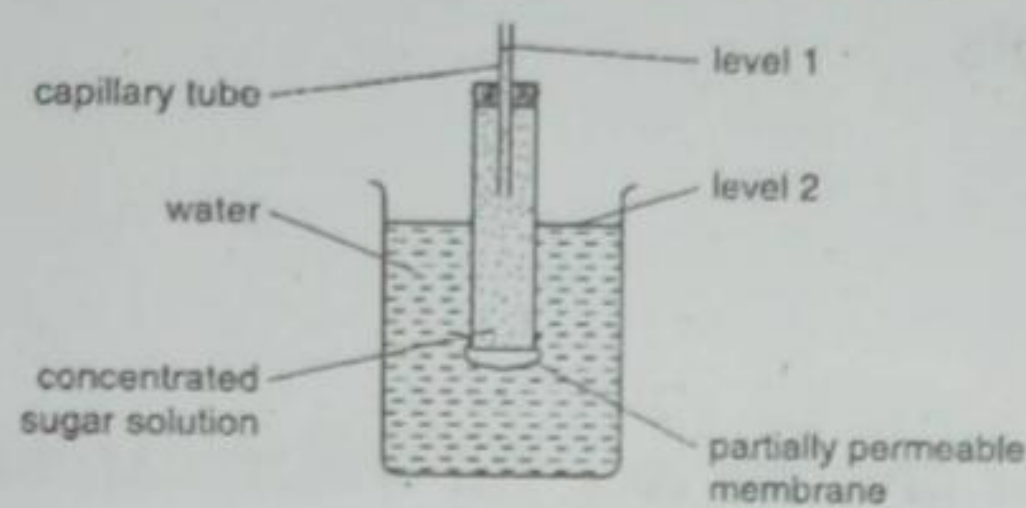
- A. Dynamic equilibrium
- B. The cell gains energy
- C. A gradient
- D. Osmosis of water

A

19. The pressure that exists inside a cell when it swells is _____ pressure.

- A. Osmosis
- B. Isotonic

- C. Diffusion
D. Turgor
20. Loss of water from a cell that results in a drop in turgor pressure is D
A. Exocytosis
B. Plasmolysis
C. Active transport B
D. Passive transport
21. Osmosis does not occur when a cell is placed into a(n) _____ solution. B
A. Hypotonic
B. Isotonic
C. Hypertonic
D. Facilitate
22. The diagram shows apparatus used to investigate osmosis.



After four hours, which changes in the levels will occur and which molecules will move across the membrane?

Level 1	Level 2	Molecules	
A. Fall	Rise	Sugar	
B. Fall	Rise	Water	D
C. Rise	Fall	Sugar	
D. Rise	Fall	Water	

PHOTOSYNTHESIS

1. What are the products of photosynthesis? A
A. Glucose and Oxygen
B. Carbon dioxide and water
C. Glucose and carbon dioxide
D. Water and oxygen
2. Four test tubes were filled with pond water and prepared as shown in the table below.

A	B	C	D
Tube A	Tube B	Tube C	Tube D
Pond weed	Pond weed	Pond weed	Pond weed
	Water		Tube enclosed in aluminium foil
25 ⁰ C	25 ⁰ C	10 ⁰ C	25 ⁰ C

D

Choose the tube that would have the larger amount of oxygen.

3. Plants must have a constant supply of _____ because it is a raw material needed for photosynthesis.

- A. Oxygen
- B. Sugar
- C. Water
- D. ATP

C

4. _____ processes require oxygen, whereas _____ processes do not.

- A. Anaerobic, aerobic
- B. Aerobic, anaerobic
- C. Photolysis, aerobic
- D. Aerobic, respiration

B

5. Which of the following processes does not require energy in order to take place?

- A. Absorption of mineral ions by plant roots
- B. Muscle contraction
- C. Protein synthesis
- D. Osmosis

D

6. What term best describes the breakdown of glucose to form water, carbon dioxide and release energy.

- A. Excretion
- B. Catabolism
- C. Photosynthesis
- D. Anabolism

B

7. During all energy conversions, some of the energy is converted to

- A. Carbon dioxide
- B. Water
- C. Heat
- D. Sunlight

C

8. What is the molecule that is directly used by a cell for energy?

- A. Sugar
- B. Water
- C. Starch
- D. ATP

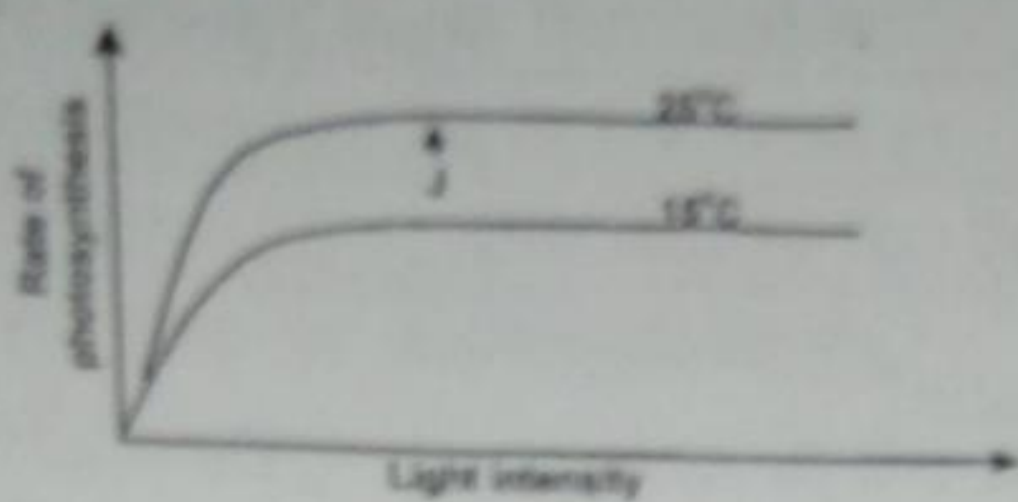
D

9. Which of the following is NOT an energy-utilizing reaction?

- A. Glycolysis
- B. Light reaction
- C. Calvin reactions
- D. Muscle contraction

C

10. The graph shows the effect of temperature and light intensity on the rate of photosynthesis.



What happens to the rate of photosynthesis when it reaches the point J?

- A. Photosynthesis stops
- B. It reaches optimum rate
- C. It continues increasing
- D. It starts reducing

B

11. What compounds act as carriers in many biological reactions?

- A. Lactic acids
- B. Alcohols
- C. Citric acids
- D. Coenzymes

D

12. When yeast ferments the sugar in a bread mixture, what is produced that causes the bread to rise?

- A. Carbon dioxide
- B. Water
- C. Ethyl
- D. Oxygen

A

13. _____ is the process by which autotrophs trap energy from sunlight to build carbohydrates.

- A. Photosynthesis
- B. Glycolysis
- C. The kreb cycle
- D. Aneorobic respiration

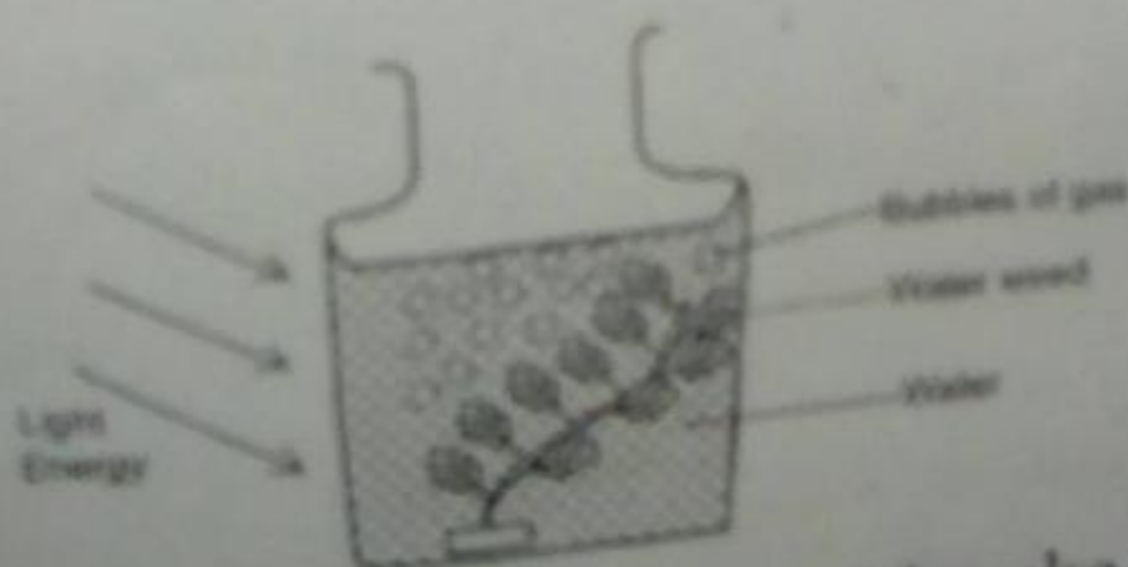
A

14. What is the function of chlorophyll in the light reaction?

- A. Capture light energy
- B. Bind CO_2 to H_2O
- C. Split to produce O_2
- D. Act as a source of CO_2

A

15. The diagram shows an experiment set to investigate photosynthesis.



Which of the following conditions would make the plant to produce bubbles fast?

@] Whatkins & Viney

Light

- A. Bright
- B. Dim
- C. Dim
- D. Bright

Temperature

- Warm
- Cool
- Water
- Cool

Dissolved carbon dioxide

- Present
- Present
- Present
- Present

A

16. What cell organelle is involved in photosynthesis?

- A. Nucleus
- B. Ribosome
- C. Chloroplast
- D. Mitochondria

C

17. Photolysis in photosynthesis is the splitting of

- A. Carbon dioxide
- B. Sugar
- C. Sunlight
- D. Water

D

18. Some bacteria are capable of capturing energy from a source other than the sun. These bacterias are called

- A. Photosynthetic
- B. Chemosynthetic
- C. Glycolytic
- D. Photolytic

B

19. Why is light important for photosynthesis? It provides

- A. Light energy to split the carbon-dioxide molecule
- B. Light energy to split water molecule
- C. Heat energy to combine carbon dioxide and water
- D. Heat energy to combine chlorophyll and carbon dioxide

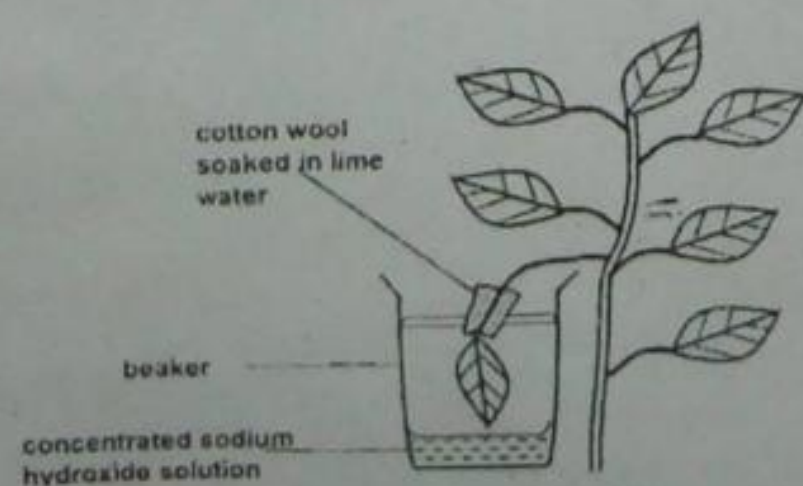
B

20. In fermentation, _____ changes either to lactic acid or to ethyl alcohol and carbon dioxide.

- A. Pyruvic acid
- B. Citric acid
- C. Oxygen
- D. Water

A

21. The diagram below shows an experiment on photosynthesis.



What is the purpose of sodium hydroxide and the cotton wool?

C

	Sodium hydroxide solution	Cotton wool
A	Supplies water to the leaf in the beaker	Supplies carbon dioxide to the leaf in the beaker
B	Removes water vapour from the beaker	Absorbs carbon dioxide from the beaker
C	Removes carbon dioxide from the beaker	Prevents entry of oxygen into the beaker
D	Supplies carbon dioxide to the leaf in the beaker	Prevents entry of carbon dioxide into the beaker

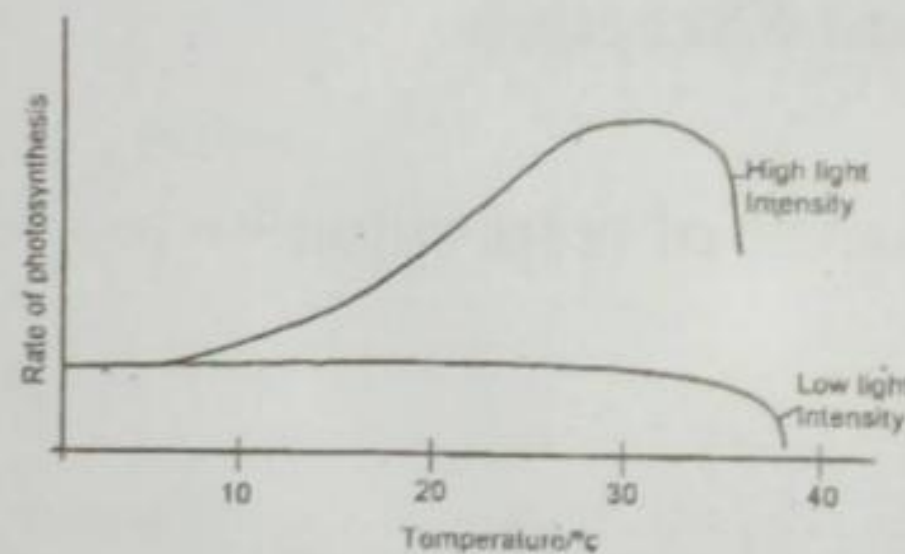
22. What is the first step of photosynthesis?
- Trapping the energy of the sun in the chloroplasts
 - Formation of starch
 - Release of oxygen
 - Production of carbon dioxide

A

23. The splitting of water during photosynthesis is called
- Chemosynthesis
 - Hydrolysis
 - Photolysis
 - Filtration

C

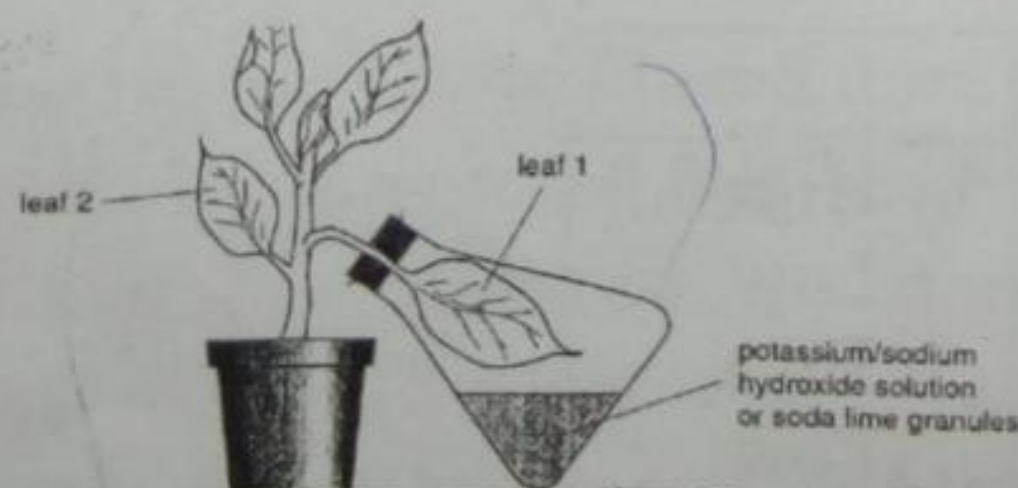
24. The diagram below shows the effect of temperature on the rate of photosynthesis at low and high intensities.



The graph shows that increasing temperature had little effect under low light intensity while increasing temperature under high intensity increased the rate of photosynthesis. Which of the following could be the possible reason for this?

- Low light intensity is not able to stimulate enzyme.
 - Low light intensity results in stomata closure.
 - High intensity provides less heat for the reaction.
 - High light intensity provides enough energy for splitting the water molecules
25. The apparatus shown was left in the light for five days. Leaves 1 and 2 were then tested for starch.

D

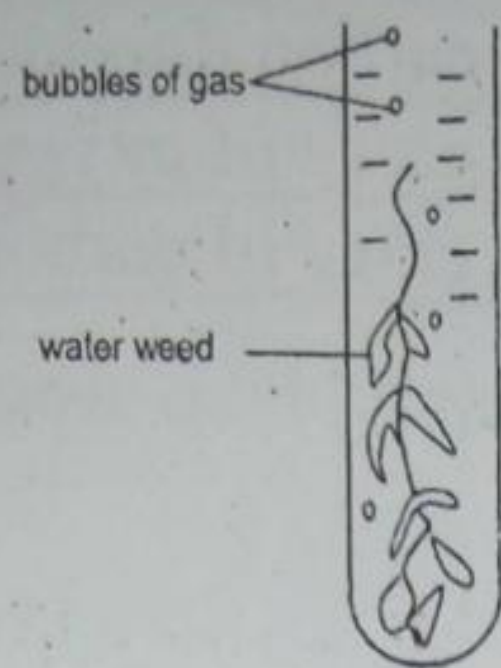


The experiment is used to show that, during starch formation,

- Carbon dioxide is absorbed
- Carbon dioxide is released
- Oxygen is absorbed
- Oxygen is released

A

26. The figure below shows an experiment to investigate photosynthesis.



Under what conditions would the plant produce most bubbles?

Dissolved carbon dioxide

Light

Temperature

- A. Present
- B. Present
- C. Absent
- D. Absent

- bright
- bright
- dim
- bright

- warm
- cool
- warm
- cool

A

Respiration, Circulation and Excretion

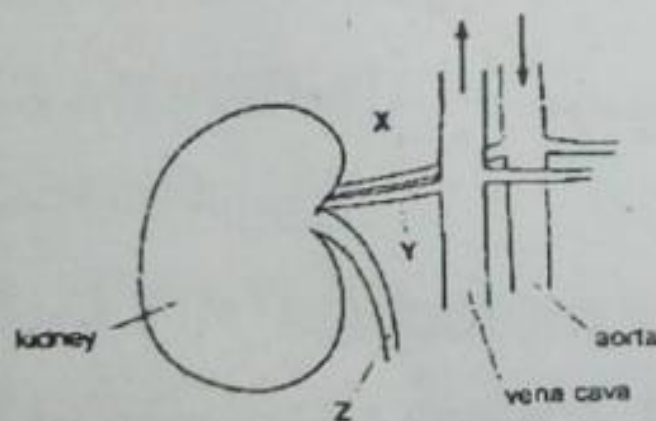
1. Which of these is NOT involved in the process of respiration?

- A. Trachea
- B. Bronchi
- C. Villi
- D. Alveoli

C

2. The diagram shows the structures associated with a human kidney. What are the relative concentrations of urea in x, y and z?

B



	X	Y	Z
A	High	Low	High
B	High	Low	Low
C	Low	High	High
D	Low	High	Low

3. Which of the following when present in urine, shows that a person is diabetic?

- A. Glucose
- B. Sodium chloride

- C. Urea
- D. Water

A

4. The production of urea increases when the diet contains larger amounts of
- A. Carbohydrates
 - B. Fat
 - C. Minerals
 - D. Protein

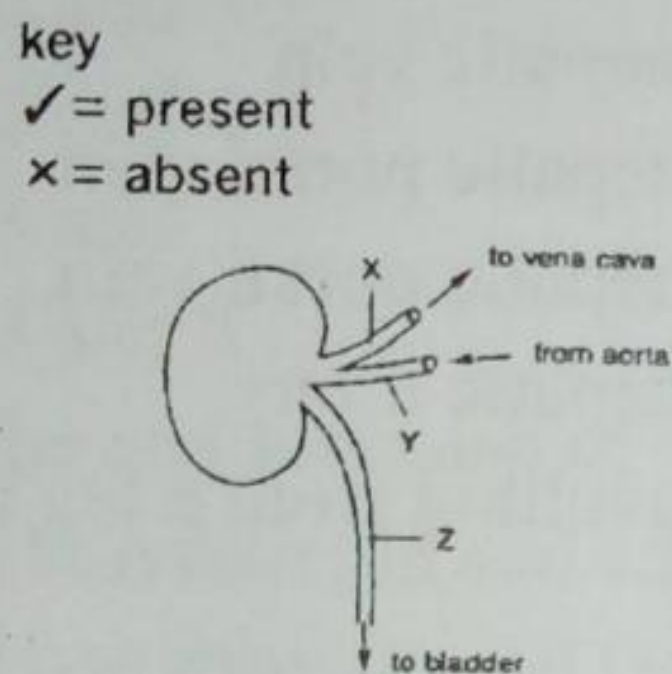
D

5. Which substances are found in the glomerular filtrate in the kidney of a mammal?

	glucose	protein	salt
A	✓	✓	X
B	✓	X	✓
C	X	✓	✓
D	X	X	✓

B

6. The diagram shows the kidney and three tubes associated with it. Where will urea be formed?



- A. z only
- B. x and z only
- C. x and y only
- D. x, y and z

D

7. Which substance is present in the blood but not in the urine of a healthy person?

- A. Glucose
- B. Salts
- C. Urea
- D. Water

A

8. Urea is produced in one organ, filtered from the blood by a second organ and stored inside a third organ before being expelled from the body. Which organs carry out these functions?

	Production	filtration	storage
A.	Kidney	bladder	liver
B.	Kidney	liver	bladder
C.	Liver	bladder	kidney
D.	Liver	kidney	bladder

D

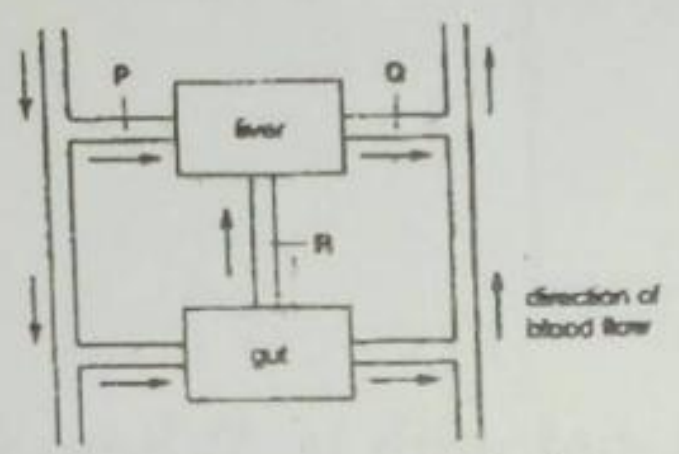
9. Which two organs are connected by the hepatic portal vein?

- A. Intestine and kidneys

- B. Intestine and liver
- C. Liver and kidneys
- D. Lungs and heart

10. Which substance is present at a lower concentration in the renal artery than in the renal vein? B
- A. Amino acids
 - B. Carbon dioxide B
 - C. Glucose
 - D. Urea

11. The diagram shows the liver and associated blood vessels. What are the blood vessels labeled P, Q and R?



- | | | | |
|-------------------|---------------------|---------------------|---|
| P | Q | R | |
| A. Hepatic artery | hepatic portal vein | hepatic vein | B |
| B. Hepatic artery | hepatic vein | hepatic portal vein | |
| C. Hepatic vein | hepatic artery | hepatic portal vein | |
| D. Hepatic vein | hepatic portal vein | hepatic artery | |

12. Which is the shortest route that can be taken by the blood travelling from a leg to an arm in the human body?

- A. Leg → heart → lungs → heart → arms
- B. Leg → heart → lungs → liver → arms
- C. Leg → liver → heart → lungs → arms A
- D. Leg → lungs → heart → lungs → arms

13. The level of glucose in blood plasma is highest in the

- A. Aorta
- B. Hepatic portal vein B
- C. Pulmonary vein
- D. Renal vein

14. Which of the following is the correct route for blood flow in a mammal?

- | | | | | |
|-----------------|-----------------|----------------|-----------------|--|
| A. Left atrium | left ventricle | lungs | right ventricle | right atrium |
| B. Left atrium | left ventricle | right atrium | right atrium | lungs D |
| C. Right atrium | right ventricle | left ventricle | left atrium | lungs |
| D. Right atrium | right ventricle | lungs | left atrium | left ventricle |

15. The table below shows the characteristics of the blood in one blood vessel in the body. Which blood vessel contains blood with these characteristics?

Oxygen concentration	Carbon dioxide concentration	Pressure
High	Low	High

- A. Aorta

B. Pulmonary artery

C. Pulmonary vein

D. Vena cava

A

6. Which blood vessels carry absorbed food molecules directly from the intestine to the liver?

A. Hepatic artery

B. Hepatic portal vein

C. Hepatic vein

D. Vena cava

B

7. Five processes which take place in living organisms are listed.

1. Release of carbon dioxide

2. Release of energy

3. Release of oxygen

4. Uptake of oxygen

5. Uptake of water

Which three processes occur during aerobic respiration?

A. 1, 2 and 3

B. 1, 2 and 4

C. 1, 3 and 5

D. 2, 3 and 5

B

18. What are the end products of aerobic respiration in yeast cells?

A. Carbon dioxide and ethanol

B. Carbon dioxide and lactic acid

C. Carbon dioxide and water

D. Ethanol and water

A

19. The table shows ventilation rates of an adult man while resting and while exercising.

Adult man	Volume of air inhaled Per breath/ cm^3	Number of breaths Per minute	Volume of air exchanged per minute/ cm^3
Resting	4000	20	8000
exercising	1200	40	?

What was the volume of air exchanged per minute while exercising?

A. 16000cm^2

B. 24000cm^2

C. 32000cm^2

D. 48000cm^2

D

20. An athlete runs 100 meter race. The following changes take place in the athlete's body during the race.

1. Increased availability of oxygen to muscle

2. Increased breathing rate

3. Increased carbon dioxide concentration in the blood

4. Increased production of carbon dioxide by muscle

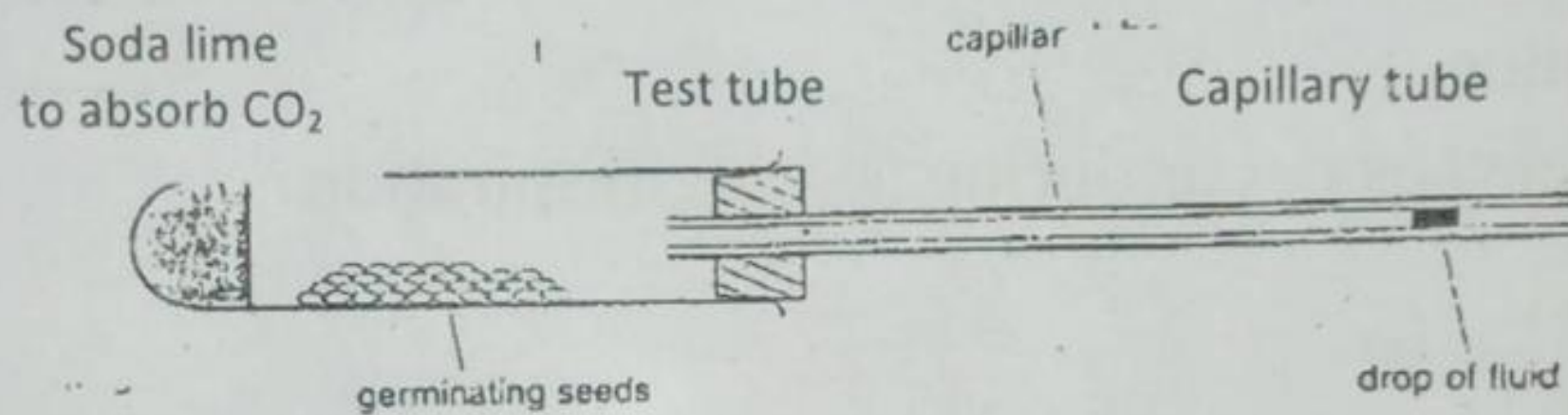
In which order do these changes occur?

	First - last			
A	1	2	3	4
B	2	1	4	3
C	2	4	3	1
D	4	3	2	1

21. What is the approximate oxygen content expired air?

- A. 0%
- B. 4%
- C. 16%
- D. 20%

22. The apparatus shown is set up for an experiment to investigate respiration. What will happen to the drop of fluid in the capillary tube over the next few hours?

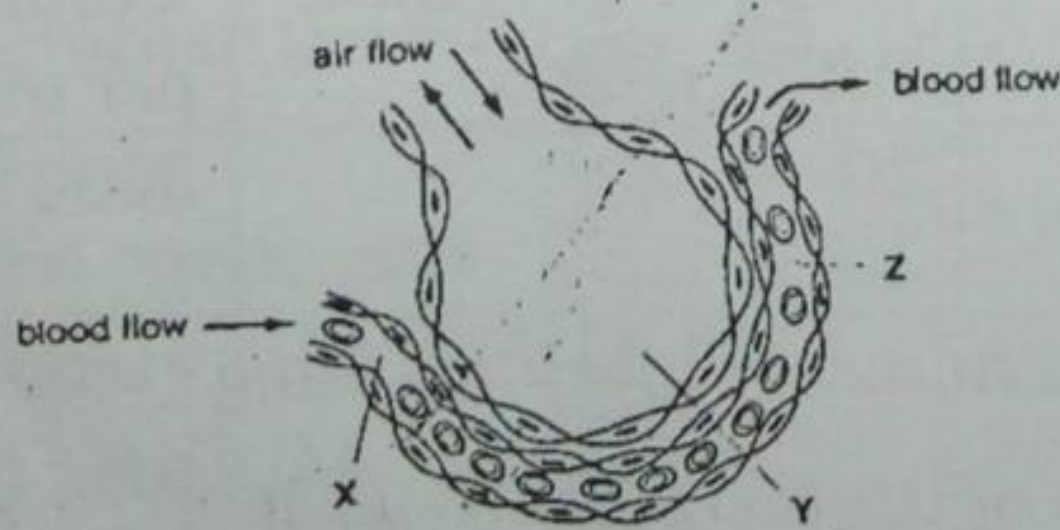


Germinating seeds

Drop of fluid

- A. It will move away from the test tube because of oxygen output by the seeds
- B. It will move towards the test tube because of carbon dioxide intake by the seeds
- C. It will move towards the test tube because of oxygen intake by the seeds
- D. It will not move because carbon dioxide intake and oxygen output are equal

23. The diagram shows a section through an alveolus and a blood capillary. What are the concentration of carbon dioxide at X, Y and Z?



	X	Y	Z
A	High	high	low
B	High	low	low
C	Low	high	high
D	Low	high	low

What are the oxygen concentrations in X, Y and Z?

B

	X	Y	Z
A	Low	High	Low
B	Low	High	High
C	High	Low	Low
D	High	low	high

24. Which changes takes place as blood flows through muscles during a long period of exercise?

Blood temperature

Concentration of dissolved lactic acid

- | | |
|--------------|-----------|
| A. Decreases | decreases |
| B. Decreases | increases |
| C. Increases | decreases |
| D. Increases | increases |

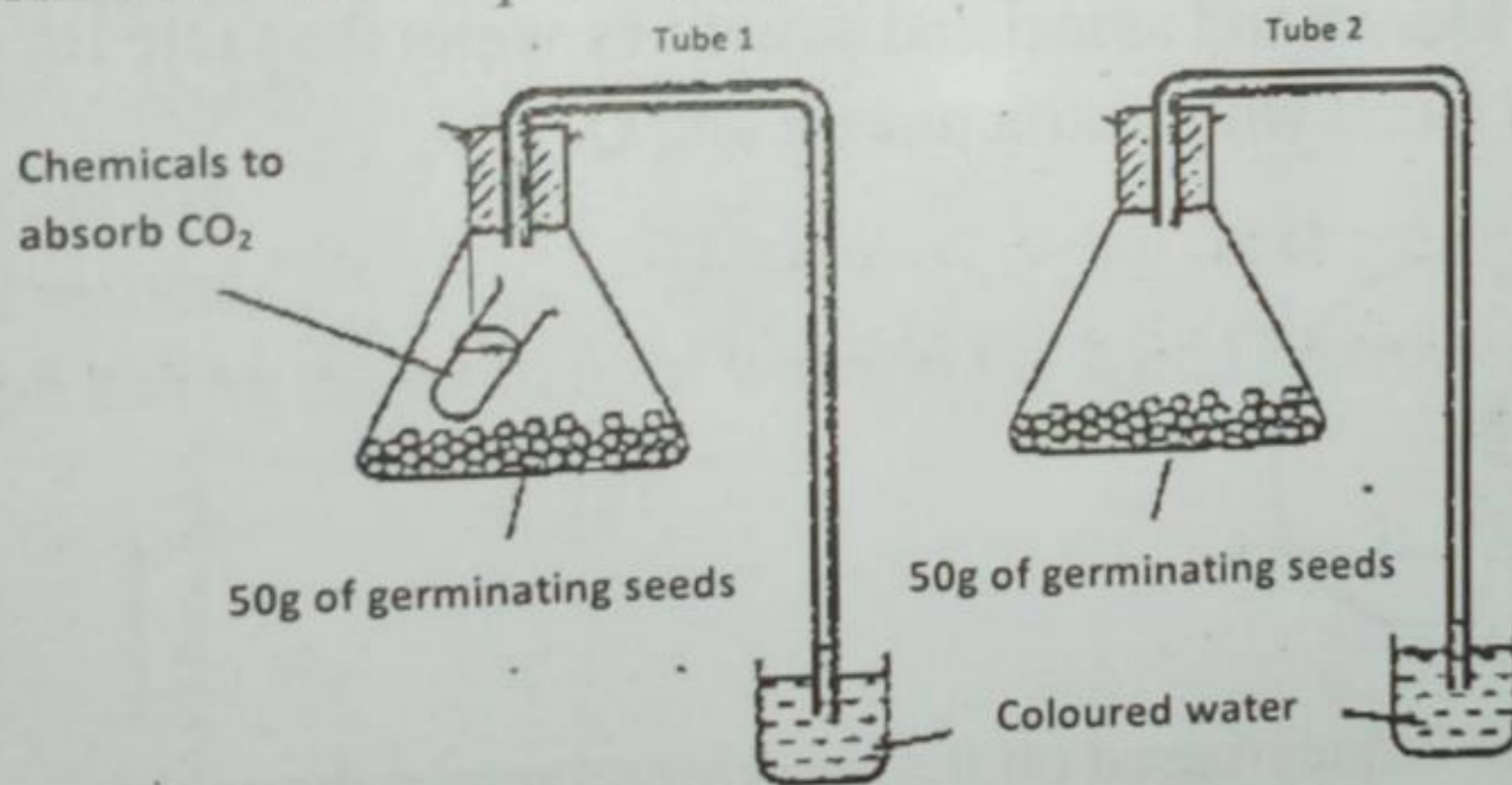
D

25. A germinating seed is soaked in blue dye, which becomes colourless in tissues that are actively respiring. What will be the appearance of the cotyledons, plumule and ^{Sunlight} radicle

- | | Cotyledons | Plumule | Radicle |
|----|------------|------------|------------|
| A. | Blue | blue | blue |
| B. | Blue | blue | colourless |
| C. | Colourless | blue | colourless |
| D. | Colourless | colourless | colourless |

A

26. An experiment was set up as shown.



After four hours, what would be the levels of the coloured water in the tubes?

- | Tube 1 | Tube 2 |
|---------------|---------------|
| A. Higher | higher |
| B. Higher | no change |
| C. No change | higher |
| D. No change | no change |

D

27. Which changes occur when a person breathes in deeply?

- | | Diaphragm | External intercostals muscle |
|----|-----------|------------------------------|
| A. | Contract | contract |
| B. | Contracts | relax |
| C. | Contracts | no change |

A

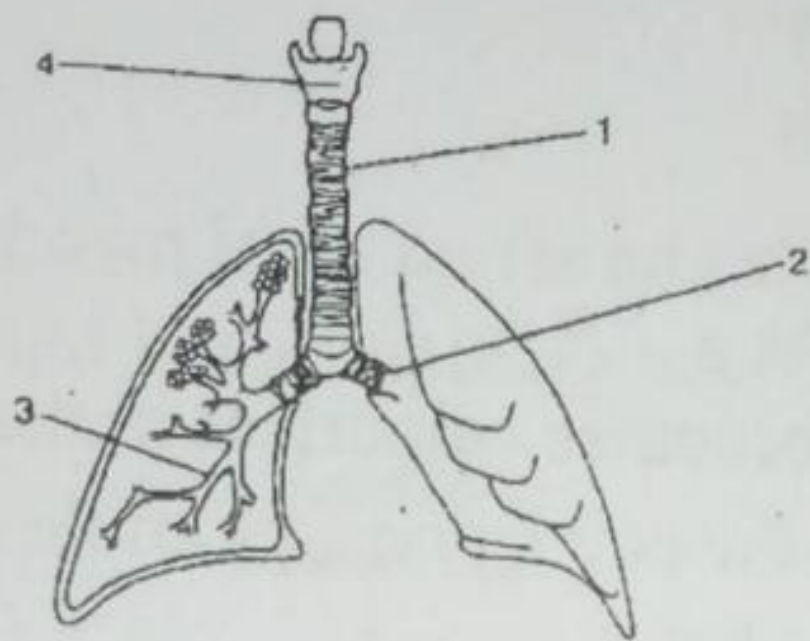
D. Relaxes contract

28. Which is the best equation to represent aerobic respiration?

- A. Carbon dioxide + water + energy \longrightarrow oxygen + sugar
- B. Energy + oxygen \longrightarrow carbon dioxide + water + energy
- C. Oxygen + sugar \longrightarrow carbon dioxide + water + energy
- D. Sugar + carbon dioxide \longrightarrow oxygen + water + energy

A

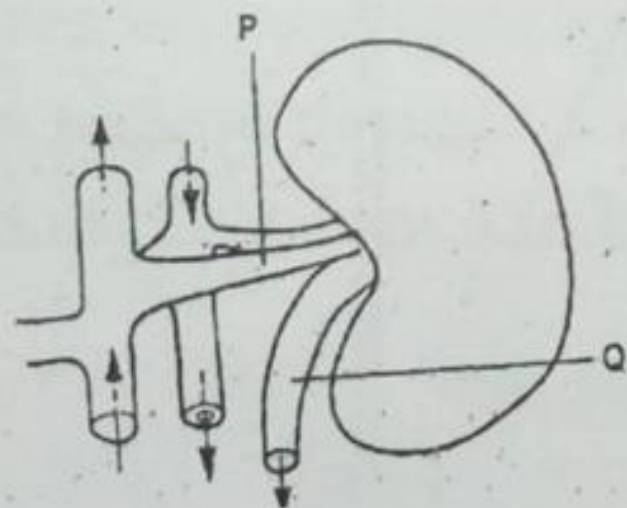
29. The diagram shows organs associated with breathing in humans. What are the numbered structures?



- | | | | |
|---------------|------------|------------|------------|
| 1 | 2 | 3 | 4 |
| A. bronchus | bronchiole | larynx | trachea |
| B. bronchiole | bronchus | larynx | trachea |
| C. larynx | trachea | bronchus | bronchiole |
| D. trachea | bronchus | bronchiole | larynx |

C

The diagram below shows the kidney and associated structures while the table lists the percentage of certain components found within structures P and Q.

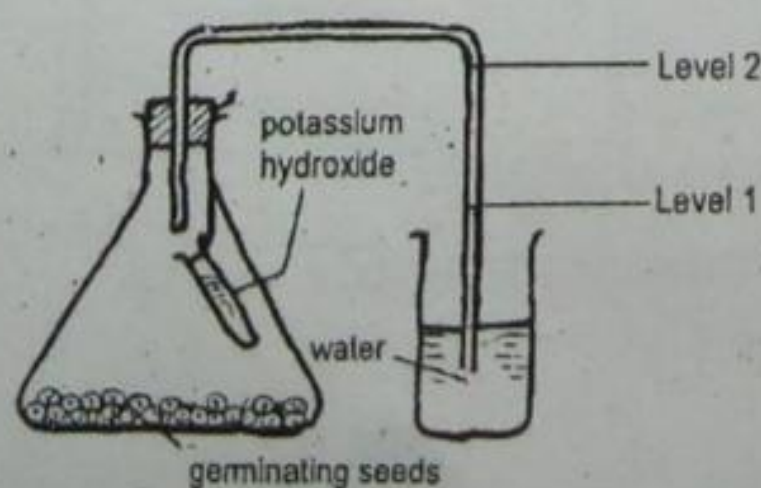


Deduce the functions of the kidney based on information given in the table.

- A. Removal of excess glucose from the blood
- B. Removal of urea and salts from the blood
- C. Removal of excess amino acids from the blood
- D. Removal of excess proteins from the blood

B

30. The diagram below shows the setup of apparatus to demonstrate respiration in germinating seeds.

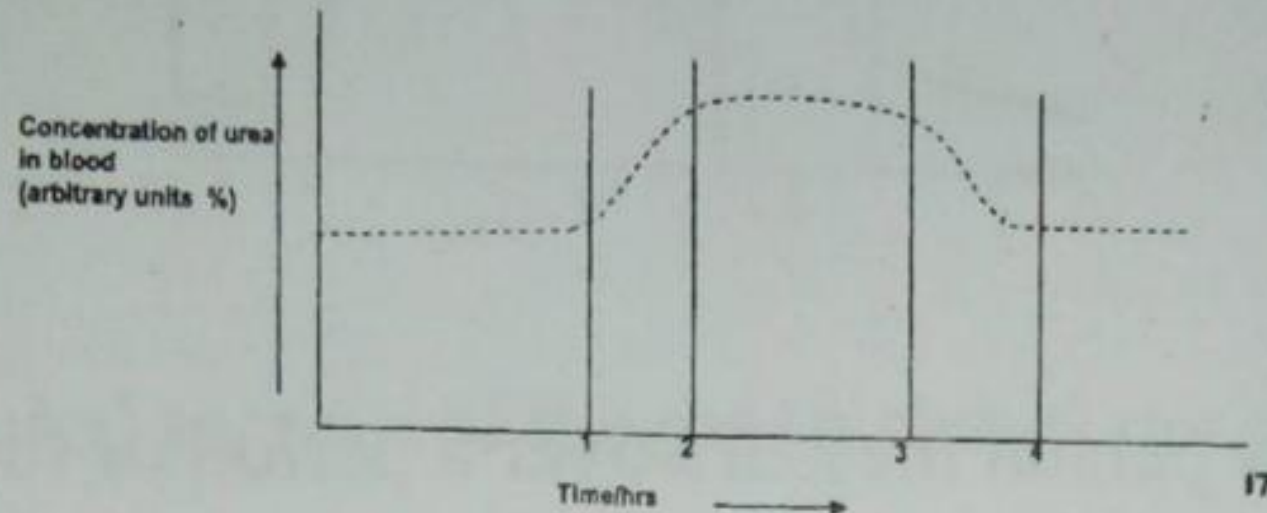


What causes the level of water to rise from level 1 to level 2 in the glass tube after six hours of experiment?

- A. Production of carbon dioxide by germinating seeds
- B. Absorption of oxygen by germinating seeds
- C. Absorption of carbon dioxide by germinating seeds
- D. Increased pressure inside the conical flask

D

31. The graph shows changes of urea concentration in blood plasma over a four hour period.



Which organ of the body is directly responsible for the changes between the hour 3 and 4?

- A. Liver
- B. Pancreas
- C. Skin
- D. Kidney

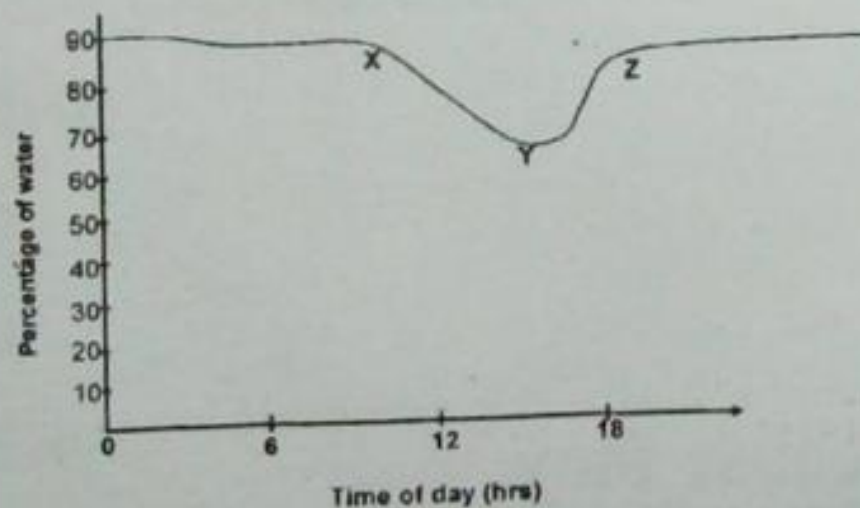
D

32. The _____ divides into two narrower tube called bronchi.

- A. Alveolus
- B. Bronchiole
- C. Pharynx
- D. Trachea

D

33. The graph shows the amount of water in the blood plasma on a particular dry day.



Which of the following is directly responsible for detecting the changes between points X and Y?

- A. Kidney
- B. Hypothalamus
- C. Pituitary gland
- D. Cerebrum

B

38. External respiration involves an exchange of gases between air in the _____ and their blood supply.

- A. Bronchi
- B. Alveoli
- C. Villi

B

D. Cilia

39. Blood that comes to the alveoli from the body cells high in

- A. Oxygen
- B. Carbon dioxide
- C. Hydrogen
- D. Nitrogen

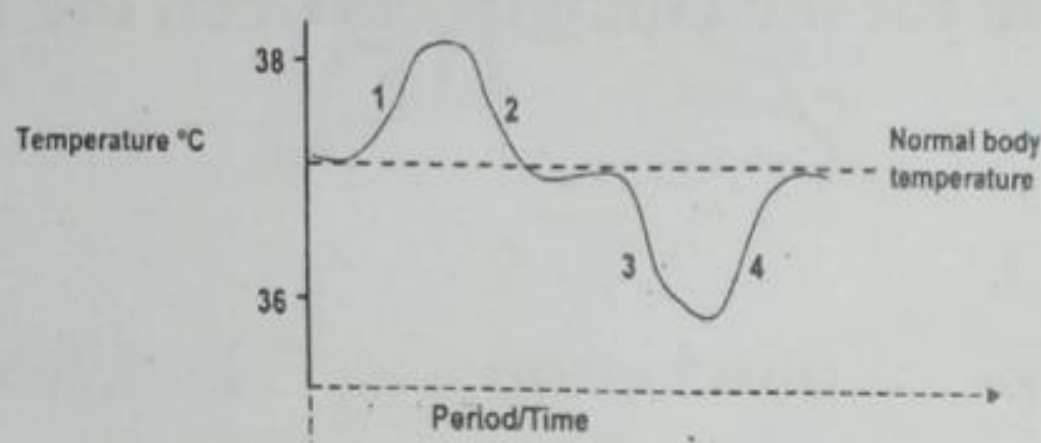
B

40. Which of the following is NOT involved in inhalation?

- A. The muscles between the ribs contract
- B. The diaphragm relaxes
- C. Air rushes into the lungs
- D. The chest cavity increases in volume

B

41. The graph shows the body temperature of a person measure over a period of time.



Which stages represents vasoconstriction and vasodilation?

	Vasoconstriction	Vasodilation
A.	1	2
B.	2	3
C.	3	4
D.	4	2

B

2. Suppose you are type O blood. What type of blood could be used if needed a transfusion?

- A. Type O
- B. Type A
- C. Type B
- D. Type AB

D

43. Red blood cells are different from other body cells because they

- A. Have no nucleus
- B. Contain proteins
- C. Are round
- D. Can reproduce

A

44. The fluid portion of blood is

- A. Lymph
- B. Hemoglobin
- C. Plasma
- D. Cilia

C

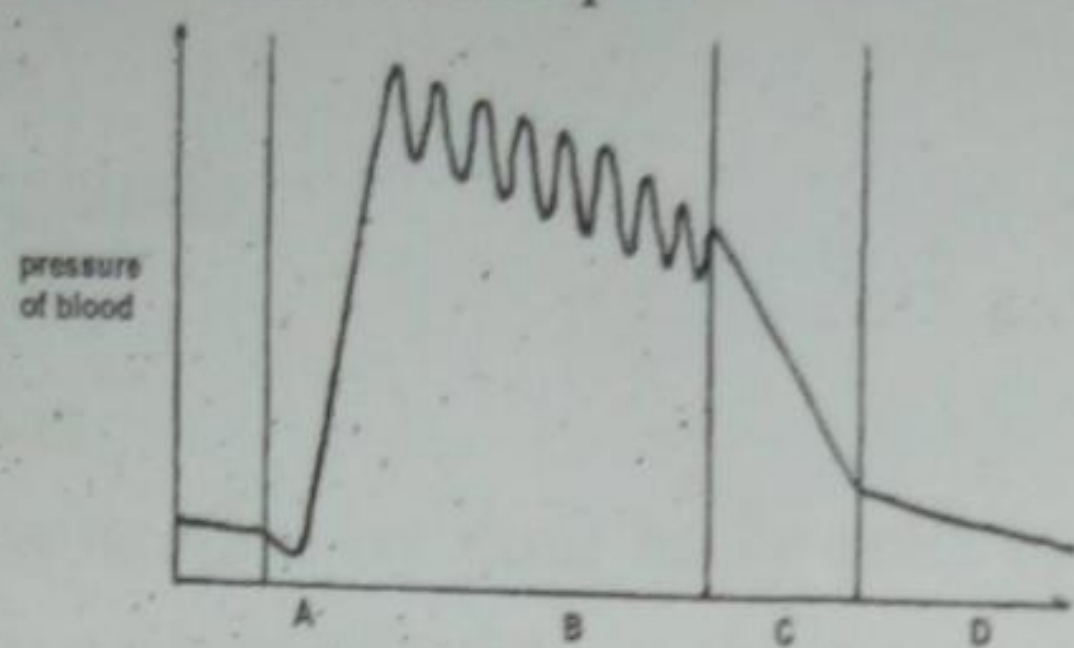
45. White blood cells differ from red blood cells in that white blood cells have

- A. A nucleus

- B. Hemoglobin
- C. Platelets
- D. Cilia

A

46. The graph below shows the pressure of the blood as it completes one systematic circulation.



A

Which labeled section of the graph shows the pressure of blood as it passes through capillaries?

47. Which cell parts are involved in blood clotting?

- A. Ribosomes
- B. Mitochondria
- C. Nucleus
- D. Platelets

D

48. Oxygen travels in the blood attached to

- A. White blood cells
- B. Hemoglobin
- C. Platelets
- D. Wastes

B

49. Differences in blood type are due to the presence or absence of proteins called _____ on red blood cell membrane.

- A. Antibodies
- B. Antigens
- C. Arteries
- D. Capillaries

B

50. Atria breathing is an involuntary process that is controlled by the

- A. Medulla oblongata
- B. Cerebrum
- C. Cerebellum
- D. Pons

A

51. Which of these is NOT a type of blood vessels?

- A. Artery
- B. Capillaries
- C. Vein
- D. Alveolus

D

52. _____ are larger, elastic blood vessels that carry blood away from the heart.

- A. Capillaries

- B. Ventricles
C. Arteries
D. Veins
53. The _____ is the largest blood vessel in the body.
A. Pulmonary artery
B. Pulmonary vein
C. Vena cava
D. Aorta
54. The basic filtering unit of the kidney is the
A. Bowman's capsule
B. Nephron
C. Bladder
D. Glomerulus
55. The primary function of the kidneys is to rid the body of
A. Carbon dioxide waste
B. Undigested food
C. Waste in the blood
D. Excess enzymes
56. Which of the following molecules would NOT be found in normal urine?
A. Glucose
B. Water
C. Salt
D. Urea
57. The renal artery branches and sends a knot of capillaries into the
A. Glomerulus
B. Bowman's capsule
C. Nephron
D. Tubules
58. Which of the following is NOT one of the levels of organization of cells in the human body?
A. Tissue
B. Organ
C. Organ system
D. Receptor
59. Which of the following systems manufactures blood cells?
A. Skin
B. Skeletal system
C. Circulatory system
D. Respiration
60. Which type of muscle line hollow internal organs?
A. Smooth

- B. Skeletal
- C. Cardiac
- D. Voluntary

A

61. Which of the following organs is NOT a part of the digestive system?
- A. Tongue
 - B. Saliva glands
 - C. Spleen
 - D. Pancreas

C

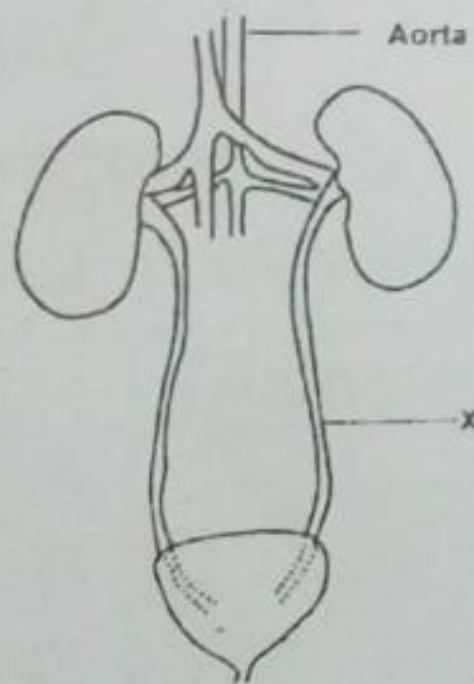
62. Oxygen is needed by your body cells to
- A. Produce carbon dioxide in the cells
 - B. Break down glucose to make ATP
 - C. Exchange Gas in the alveoli of the lungs
 - D. Provide muscles with energy to contract

B

63. What type of event occurs at the synapse between two neurons?
- A. Calcium passes from one cell to another cell
 - B. A neuron transmitter passes from one neuron to the next neuron
 - C. A wave of charges passes from one cell to the next cell
 - D. Sensory receptors detect changes inside the body

B

64. The diagram below shows part of the excretory system.



What is structure X?

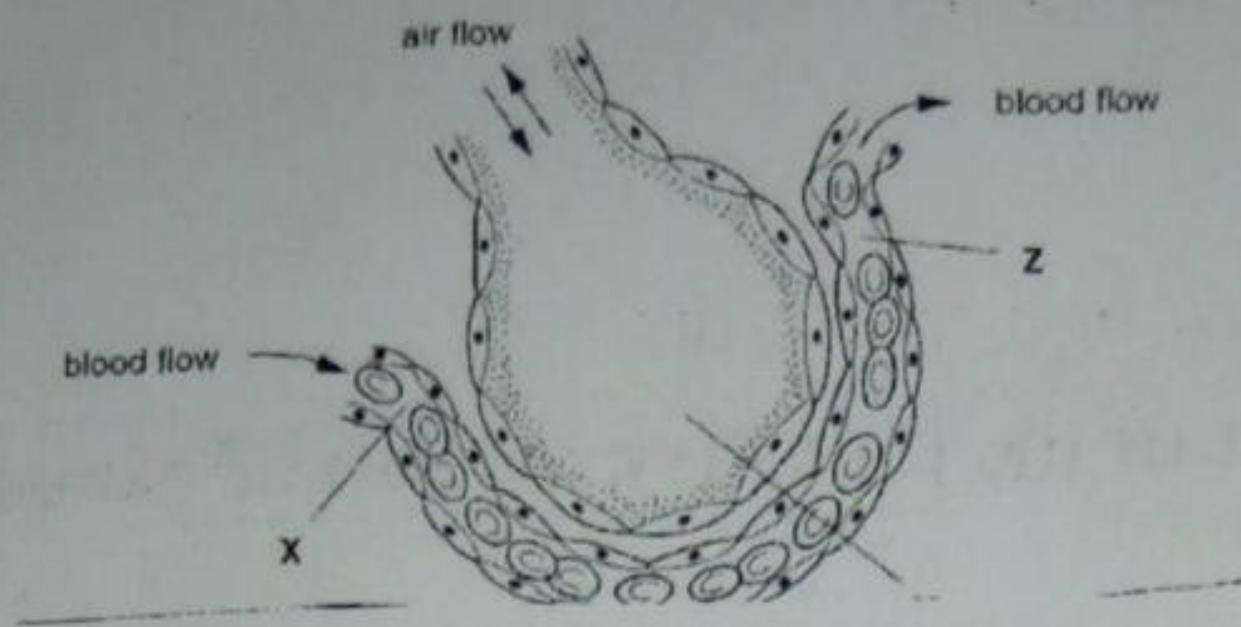
- A. Urethra
- B. Ureter
- C. Uterus
- D. Kidney

B

65. Which system secretes hormones to control the metabolic activities of the body structures?
- A. Endocrine
 - B. Nervous system
 - C. Circulatory system
 - D. Excretory system

A

66. The diagram shows a section through an alveolus and a blood capillary.



Y

What are the oxygen concentrations at X, Y and Z.

- | | X | Y | Z |
|----|------|------|------|
| A. | Low | High | High |
| B. | Low | High | Low |
| C. | High | Low | Low |
| D. | High | Low | High |

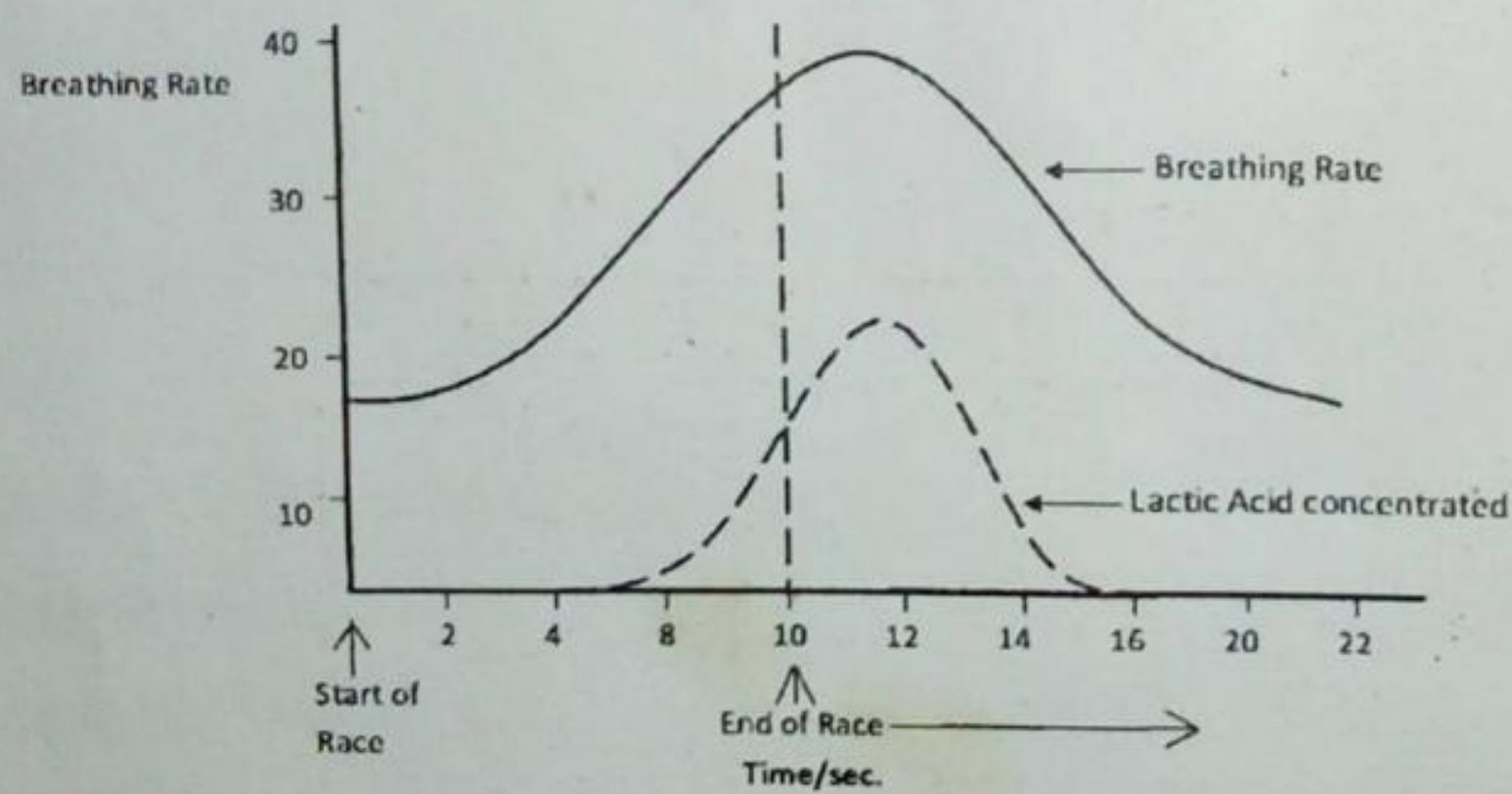
A

67. Which type of immune cells secretes anti-bodies against foreign invaders?

- A. Red blood cells
- B. T lymphocyte
- C. Spleen cells
- D. B lymphocytes

B

68. The graph below shows the change in the breathing rate of a person running in a 100m race.



If the 100m race was completed after 10 seconds, which of the following explains why the breathing rate remained high for a good 3 seconds after the race?

- A. Because of increased demand for oxygen
- B. Because of increased production of carbon dioxide
- C. Because of increased usage of glucose
- D. Because of increased production of lactic acid

D

69. Urine contains the metabolic waste products of the digestion of

- A. Glucose
- B. Fats
- C. Amino acids
- D. Water

70. The highest blood pressure, systolic pressure, is the force created by

- A. The lungs
- B. The two atria

C

D

C. The two ventricle

D. The arteries

71. What changes takes place as blood flows through the lungs?

	Blood pressure	Concentration of Glucose	Concentration of carbon dioxide
A	Decrease	Decrease	Increase
B	Increase	Increase	Increase
C	Increase	Increase	Decrease
D	Decrease	Decrease	Decrease

C

Homeostasis

1. Where is the hormone insulin produced and where does it act?

	Site of production	Site of action
A	Adrenal glands	Ileum
B	Adrenal glands	Liver
C	Pancreas	Ileum
D	Pancreas	Liver

C

2. Where are hormones destroyed?

A. Adrenal glands

B. Kidneys

C. Liver

D. Pancreas

C

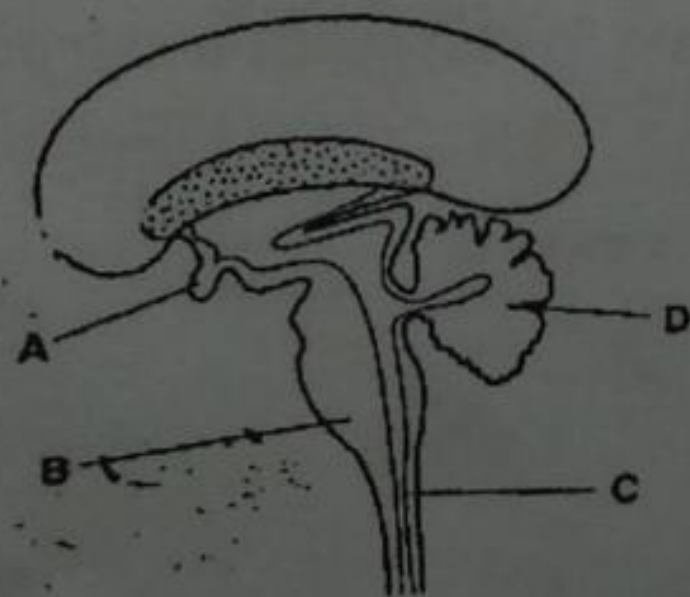
3. What happens when the core temperature of the body increases?

	Diameter of superficial blood vessels	Urine production
A	Decreased	Decreased
B	Decreased	Increased
C	Increased	Decreased
D	increased	increased

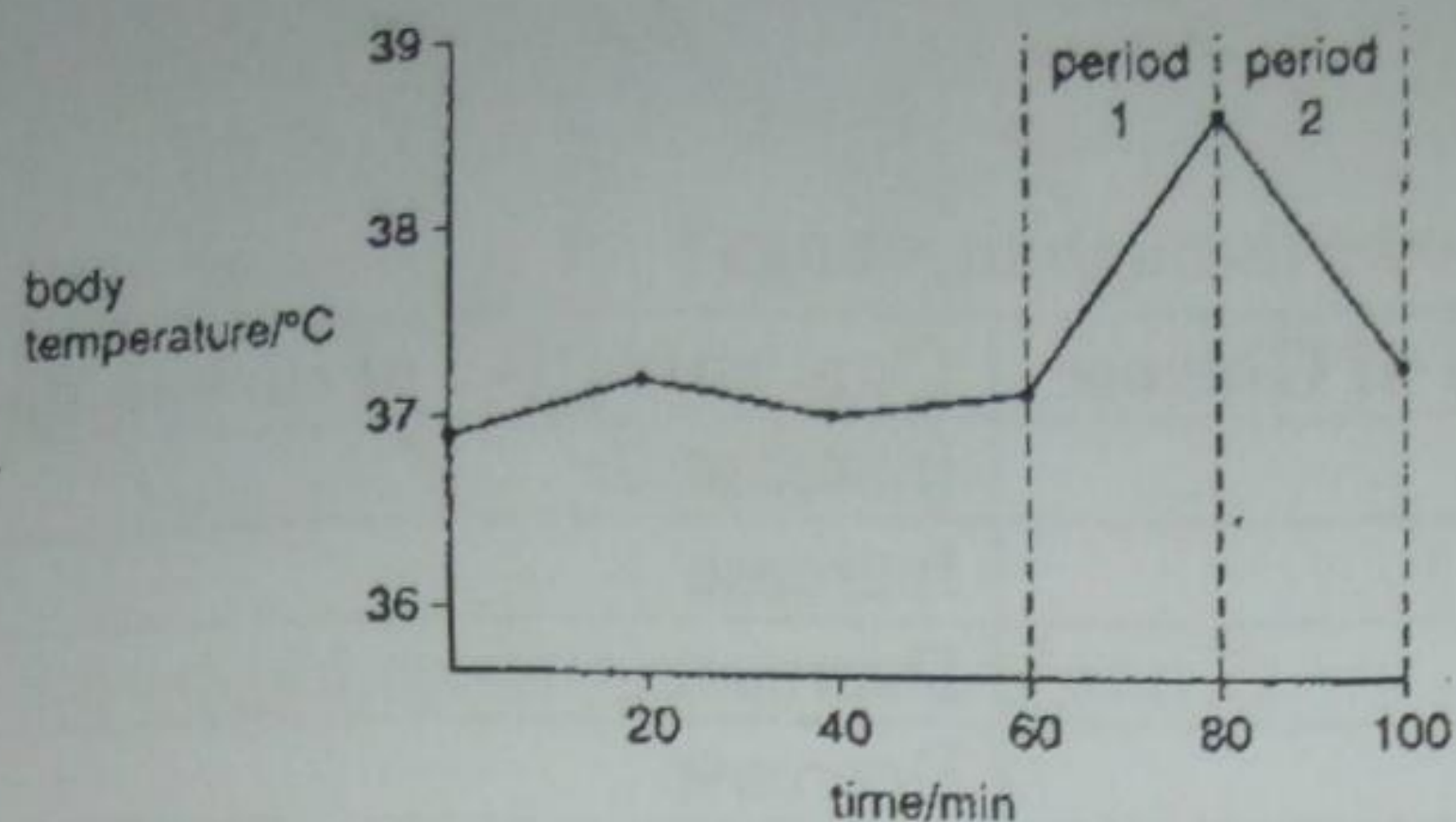
C

4. The diagram shows a section through the brain and part of the spinal cord. Which region secretes hormones?

A



5. The graph shows changes in a person when the body temperature plotted against time. What could cause the changes in body temperature in period 1 and 2?



Period 1

- A. Reduced air temperature
- B. Reduced air temperature
- C. Vigorous exercise
- D. Vigorous exercise

Period 2

- increased air temperature
- shivering
- increased sweating
- shivering

C

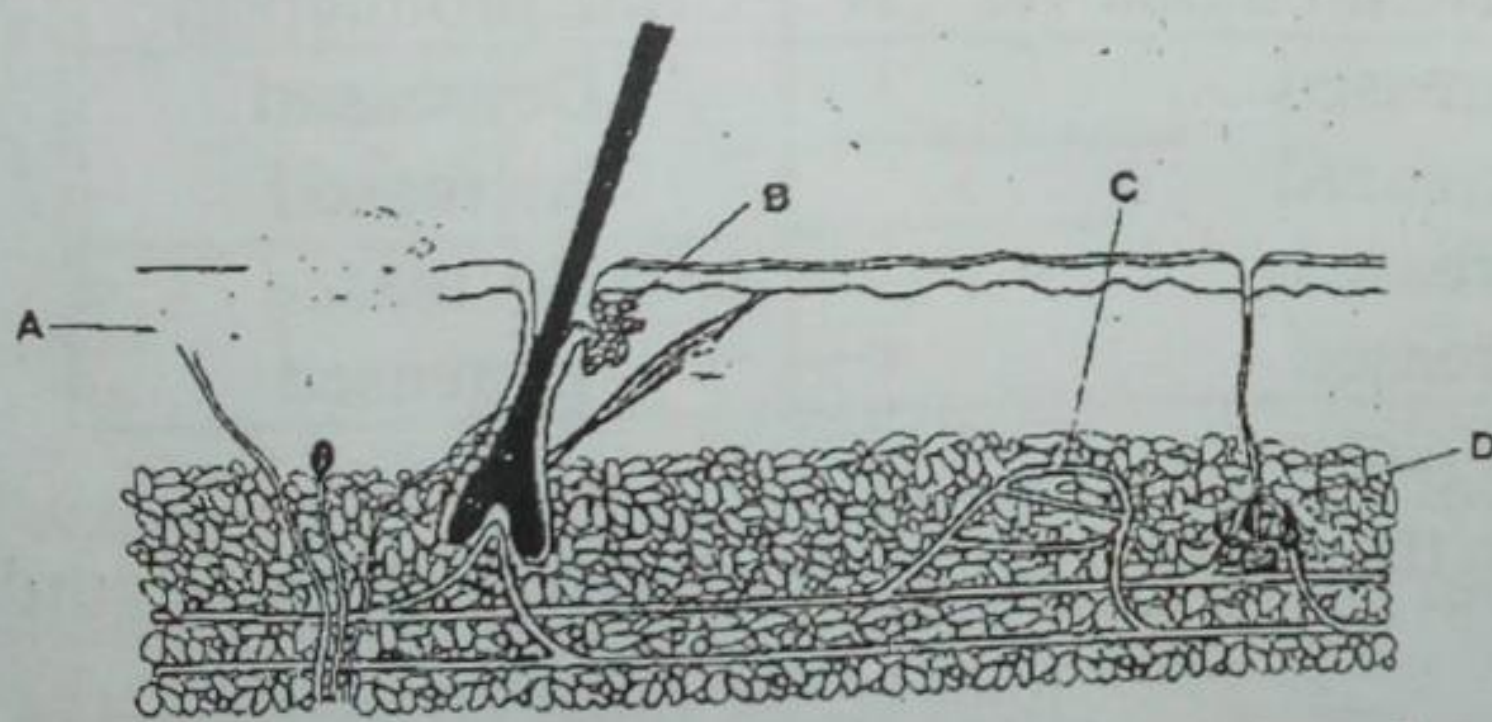
6. What happened when the body temperature falls below 37°C?

- | | |
|--------------------|-----------|
| Blood flow to skin | sweating |
| A. Decreased | decreased |
| B. Decreased | increased |
| C. Increased | decreased |
| D. Increased | increased |

A

7. The diagram shows a section through human skin. Which structure secretes a dilute solution of sodium chloride and urea?

D



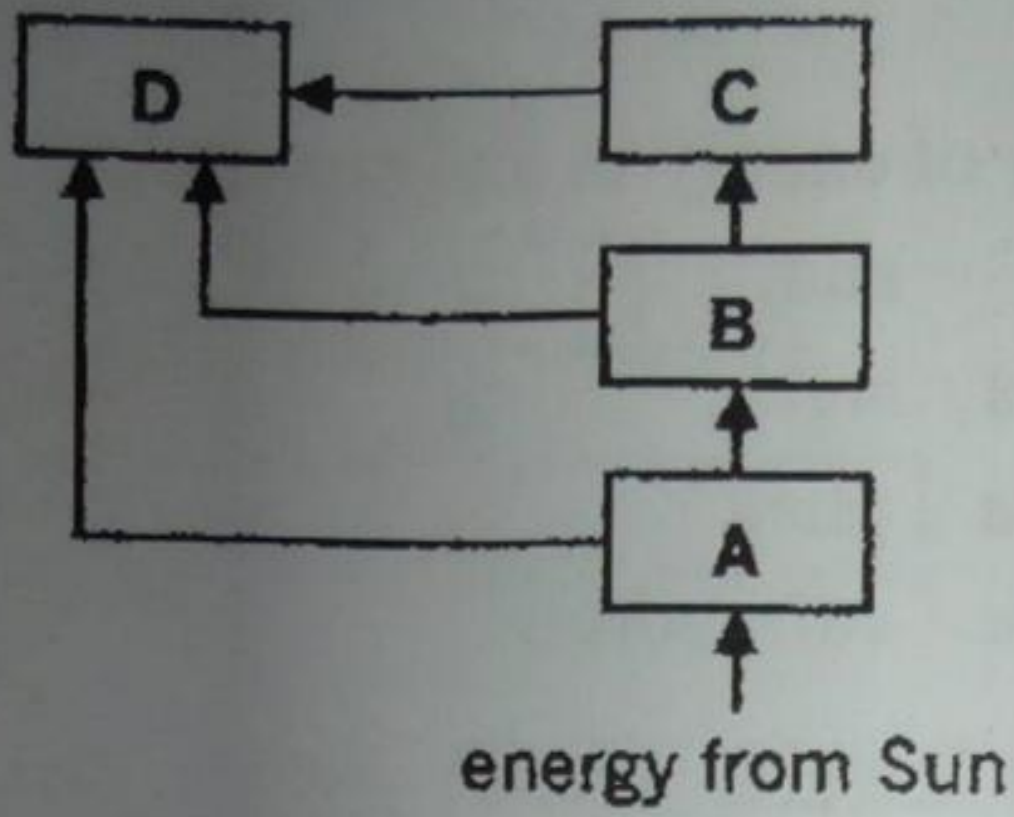
8. Which changes are likely to occur when a hotel cook walk from a very cold storeroom into a hot kitchen?

- | | | |
|-----------------|------------------|---------------------------|
| Sweating | shivering | skin blood vessels |
| A. Decreases | increases | dilate |
| B. Increases | decreases | constrict |
| C. Increases | decreases | dilate |
| D. Increases | increases | constrict |

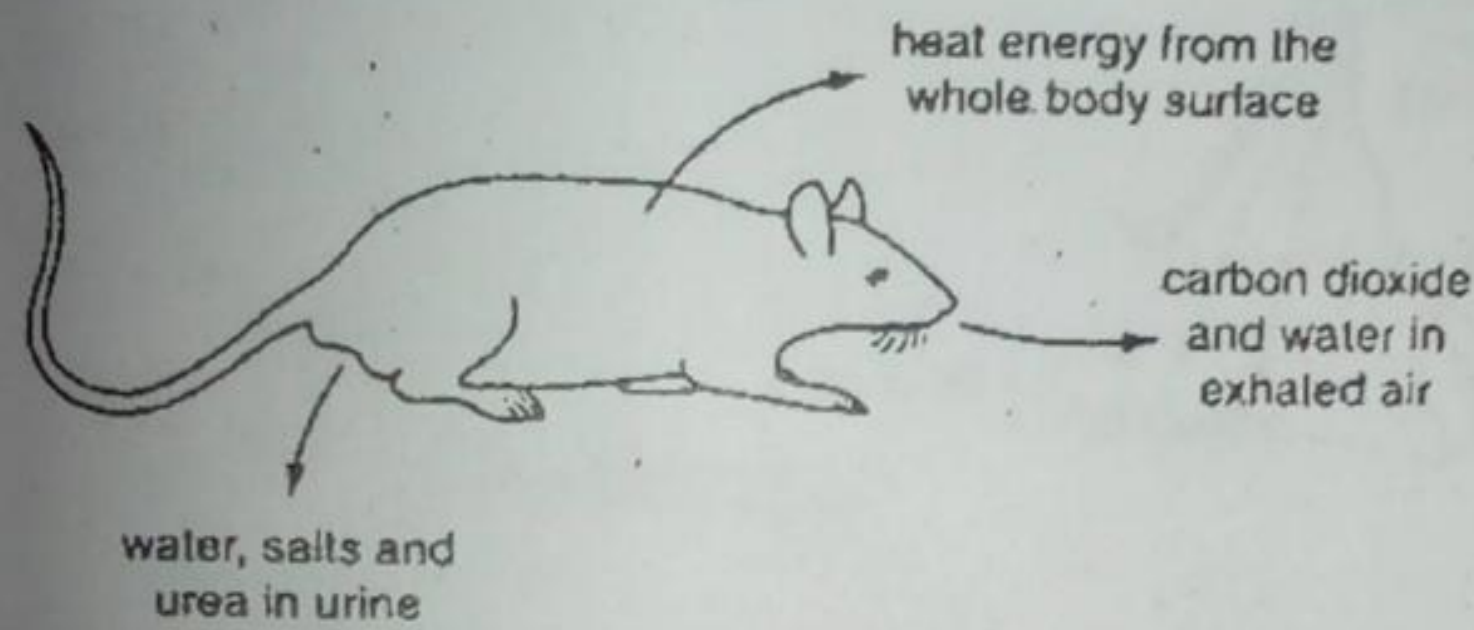
B

Relationships of organism with one another and with the environment

1. The diagram shows the of energy in a typical ecosystem. Which box represents the largest total mass of living organisms?



2. The diagram shows losses from a rat to the environment. What will not be returned to the ecosystem and recycled?

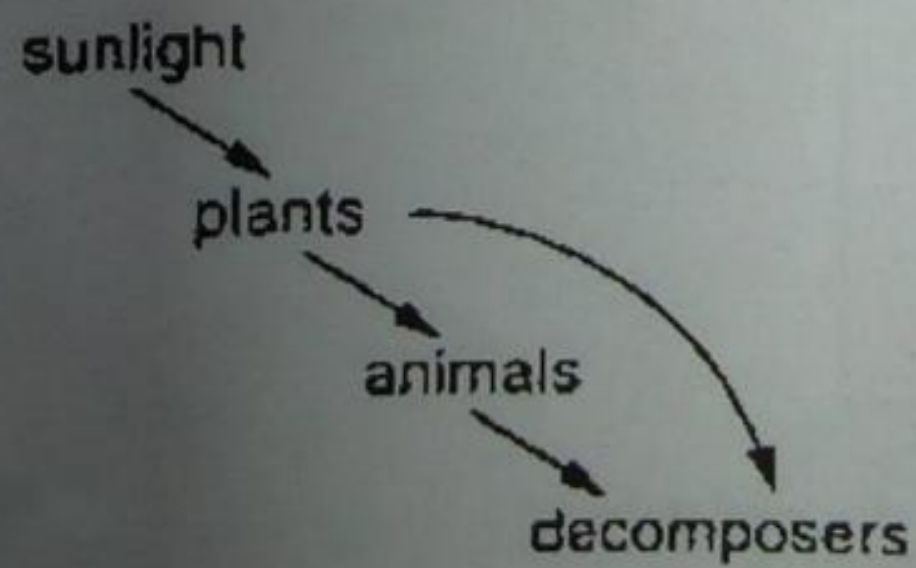


- A. Carbon dioxide
- B. Heat energy
- C. Salts
- D. Urea

3. The table shows the amount of energy flowing into four trophic levels in an ecosystem. Which letter represents the producers?

Trophic level	Energy flowing in /kJ per m ³ per year
A	3
B	32
C	301
D	3000

4. The diagram shows a simple version of the energy flow through a food web. What happens to the energy leaving the decomposers?

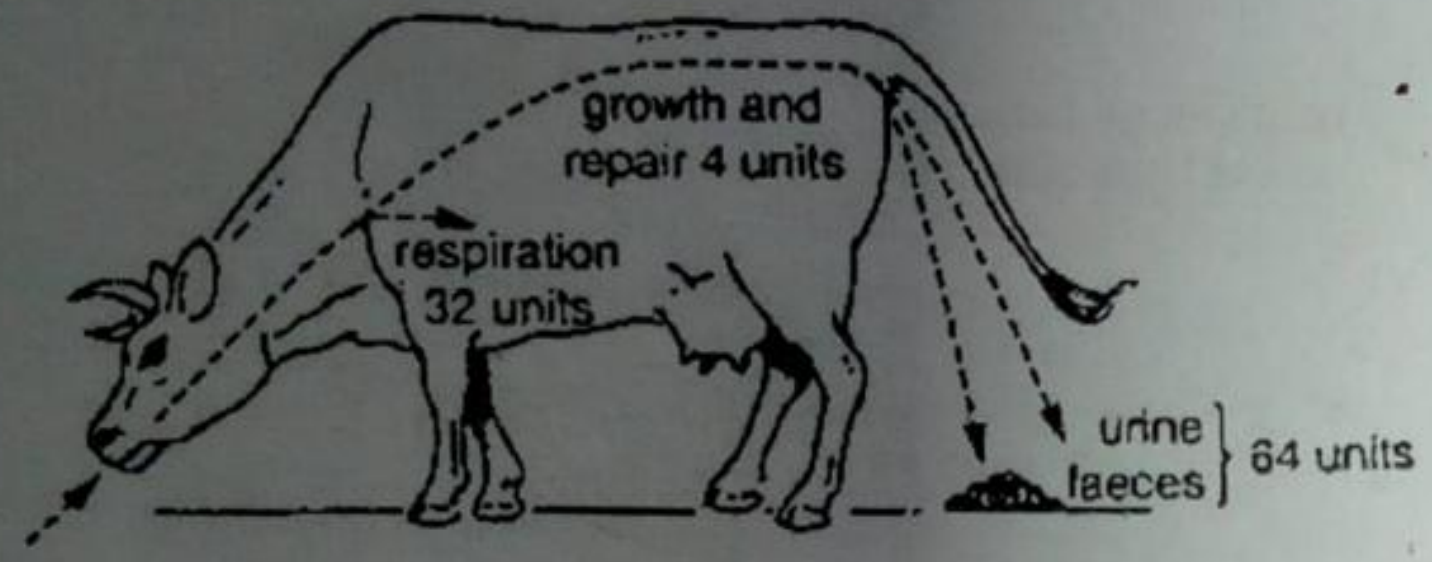


- A. It is lost as heat
- B. It is stored as carbohydrates
- C. It is reflected from the surface of the plants

- D. It is used to power industrial processes
5. Which sequence correctly describes the flow of energy in an ecosystem?
- A. Carnivore herbivore plant sun
- B. Carnivore plant herbivore sun
- C. Sun carnivore herbivore plant
- D. Sun plant herbivore carnivore

D

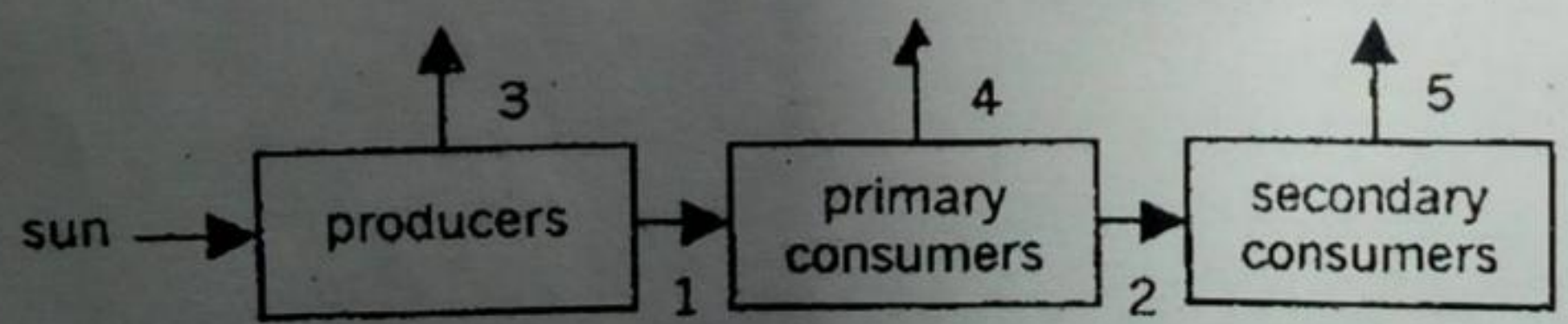
6. The diagram shows how energy from food is used by cattle. Most of the energy in the food a cow eats is



- A. Passed to decomposers
- B. Used for growth and repair
- C. Used for movement
- D. Used to maintain body temperature.

A

7. The diagram shows the flow of energy through an ecosystem. Which arrows represent the smallest amount of energy transferred between organism and the largest amount of energy lost to the ecosystem?

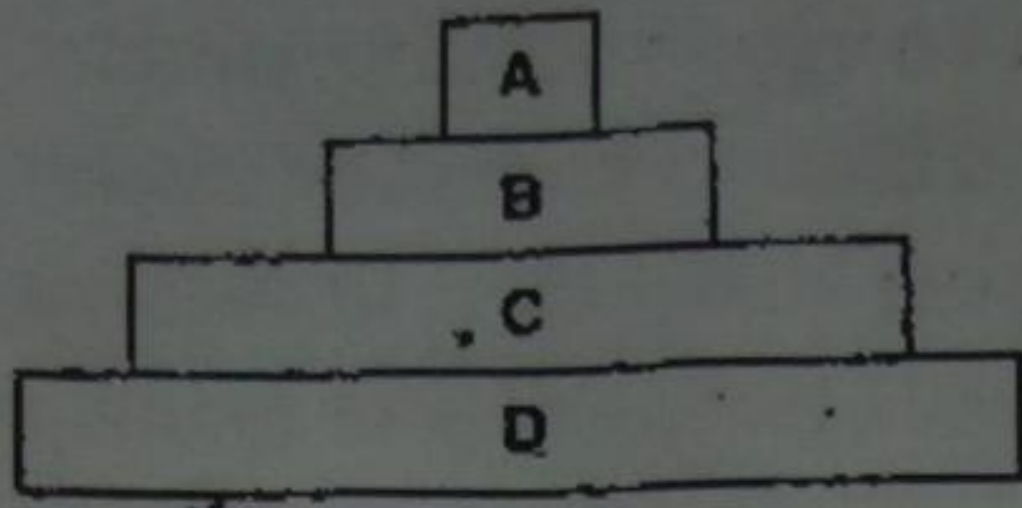


C

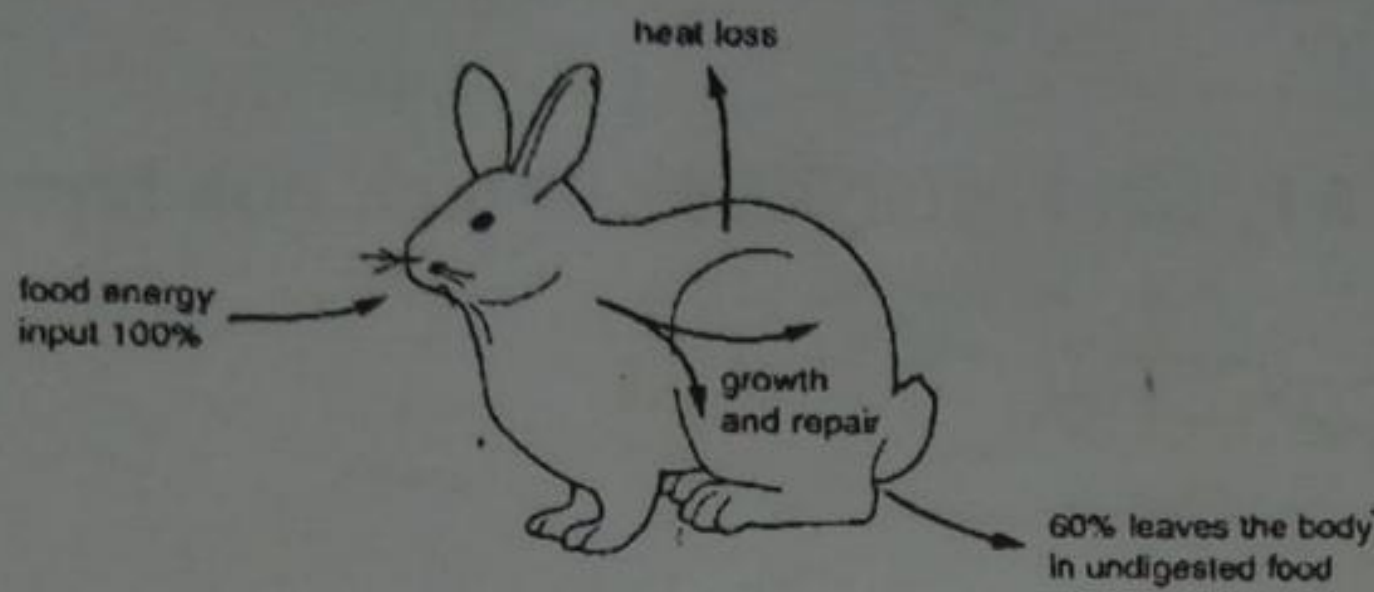
	Smallest energy transfer	Largest energy loss
A	1	3
B	1	5
C	2	3
D	2	4

Food chains and food webs

1. The diagram shows a pyramid of biomass. Which level represents the herbivores?

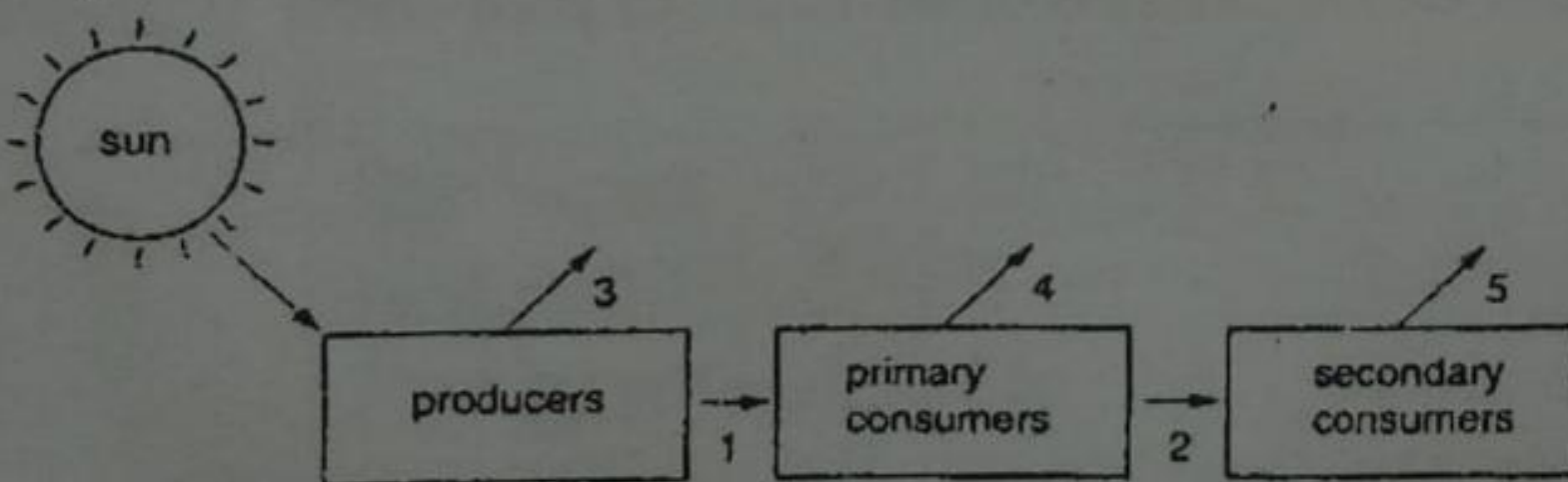


2. The diagram shows the energy losses and gains of a rabbit. Which of the following shows the percentage of energy used for growth and repair and percentage lost as heat? C
A



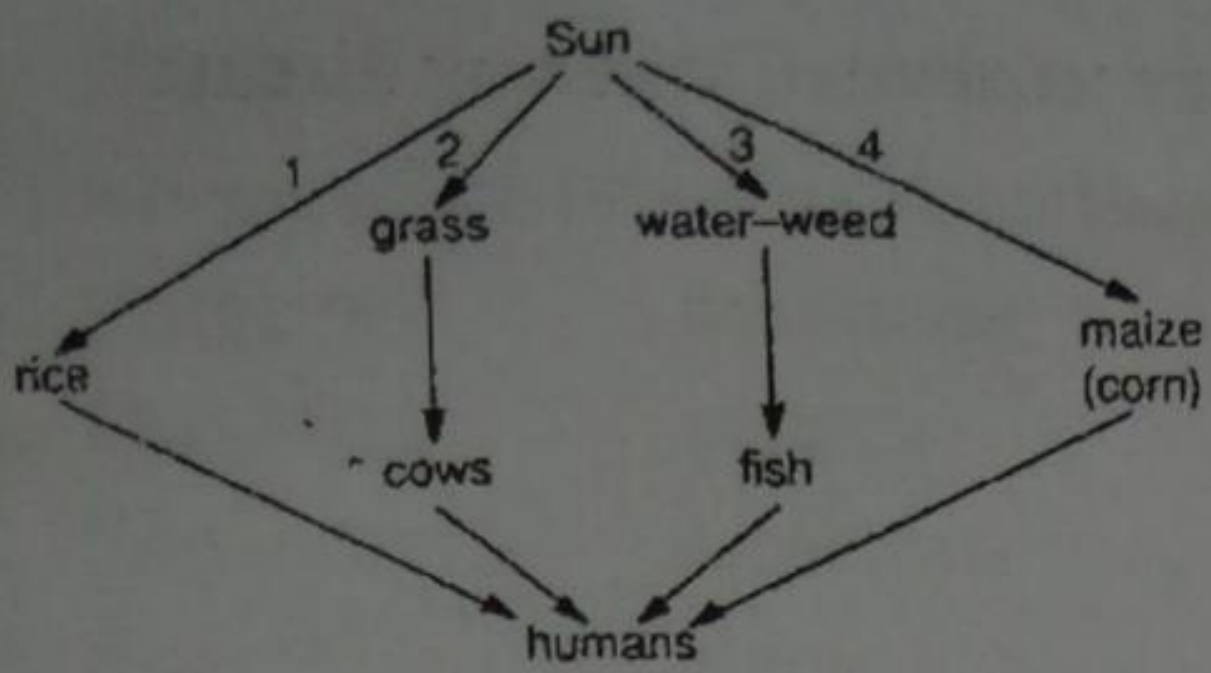
	% energy used for growth and repair	% energy lost as heat
A	10	30
B	30	10
C	30	60
D	60	30

3. The diagram shows the flow of energy in a typical ecosystem. Which arrows represent the least amount of energy transferred between organisms and the greatest amount of energy lost to the environment?



- | | Least energy transferred | Greatest energy lost |
|----|--------------------------|----------------------|
| A. | 1 | 4 |
| B. | 1 | 5 |
| C. | 2 | 3 |
| D. | 2 | 4 |

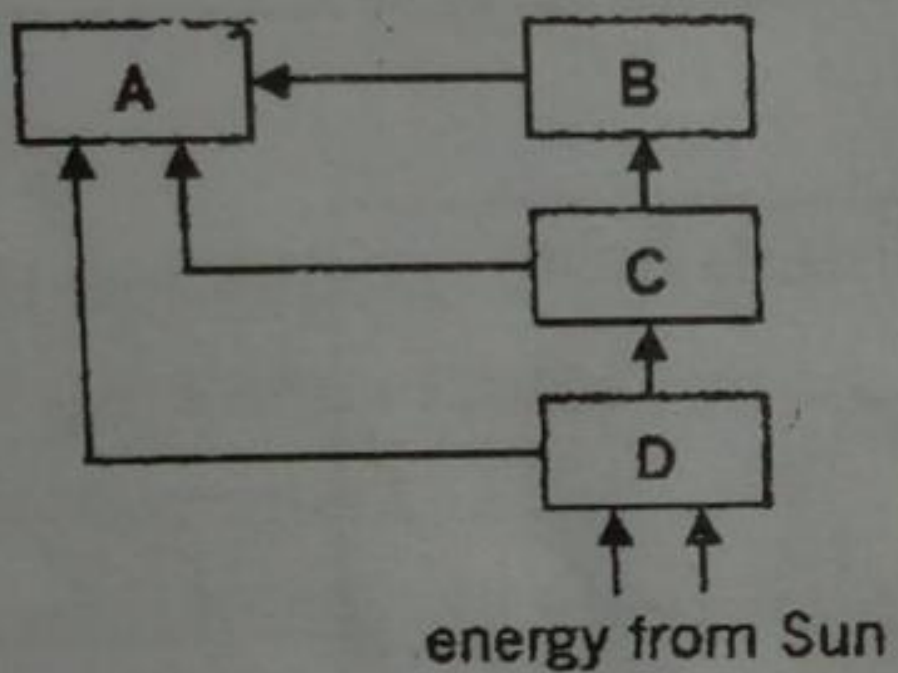
4. The diagram shows four food chains leading to humans. Which chains make the most efficient use of solar energy? A



- A. 1 and 2
- B. 1 and 4
- C. 2 and 3
- D. 2 and 4

C

5. The diagram shows the flow of energy in a typical ecosystem. Which box represents secondary consumers?



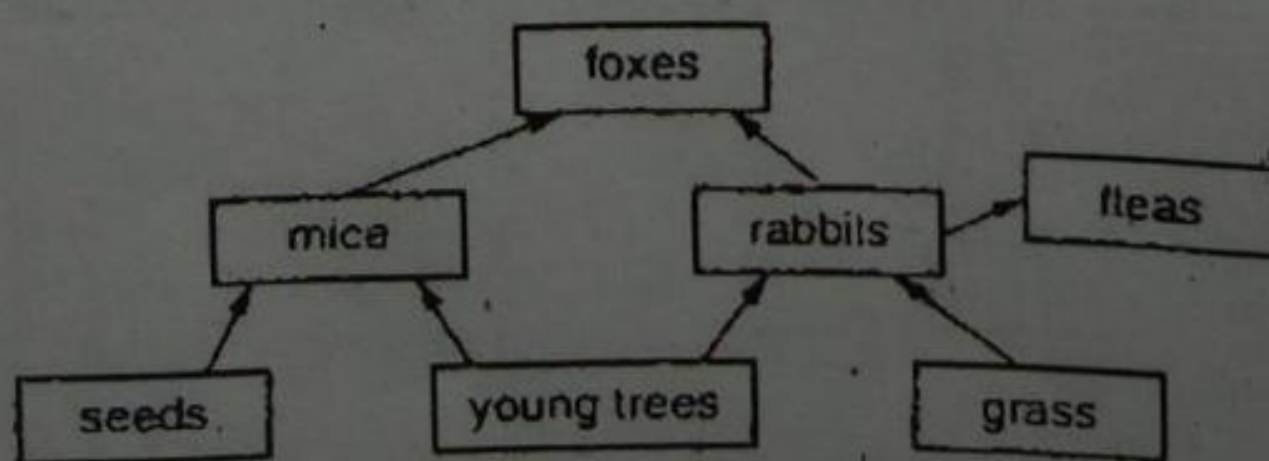
B

6. Mercury is a poison which accumulates in the bodies of organisms. A factory effluent containing mercury is discharged into the sea where there is the following food chain. Algae zooplankton invertebrates fish seabirds. Which organisms will have the greatest concentration of mercury in their tissues?

- A. Algae
- B. Fish
- C. Seabirds
- D. Zooplankton

C

7. Which of the following organisms are primary consumers?



- A. Fleas
- B. Foxes
- C. Rabbits
- D. Young trees

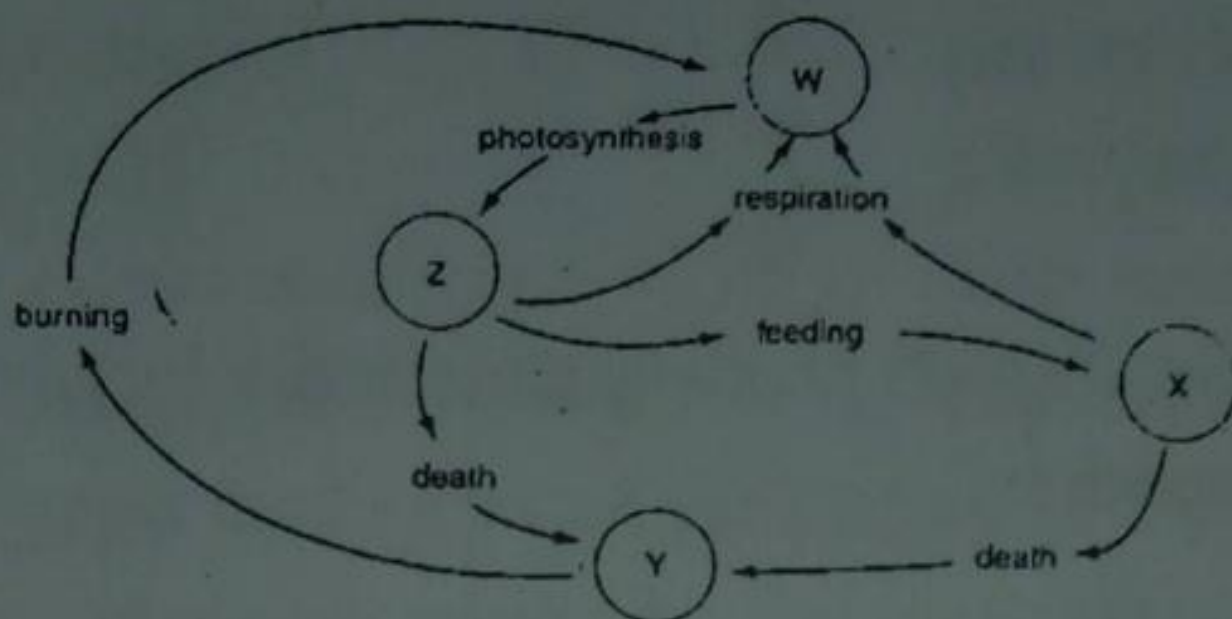
C

8. What would be the effect on the food web if the foxes were killed by disease?
- A. The number of mice would decrease
 - B. The number of rabbits would increase
 - C. The number of fleas would decrease
 - D. The number of seeds would increase

B

Nutrients and water cycle

1. The diagram shows some stage in the carbon cycle. W, X, Y and Z are carbon compounds. What is W?



- A. Carbon compounds in animal
 - B. Carbon compounds in plants
 - C. Carbon dioxide in air
 - D. Coal and oil
2. The table shows the conditions in which four groups bean seeds were sown and observations of the resulting plants.

A

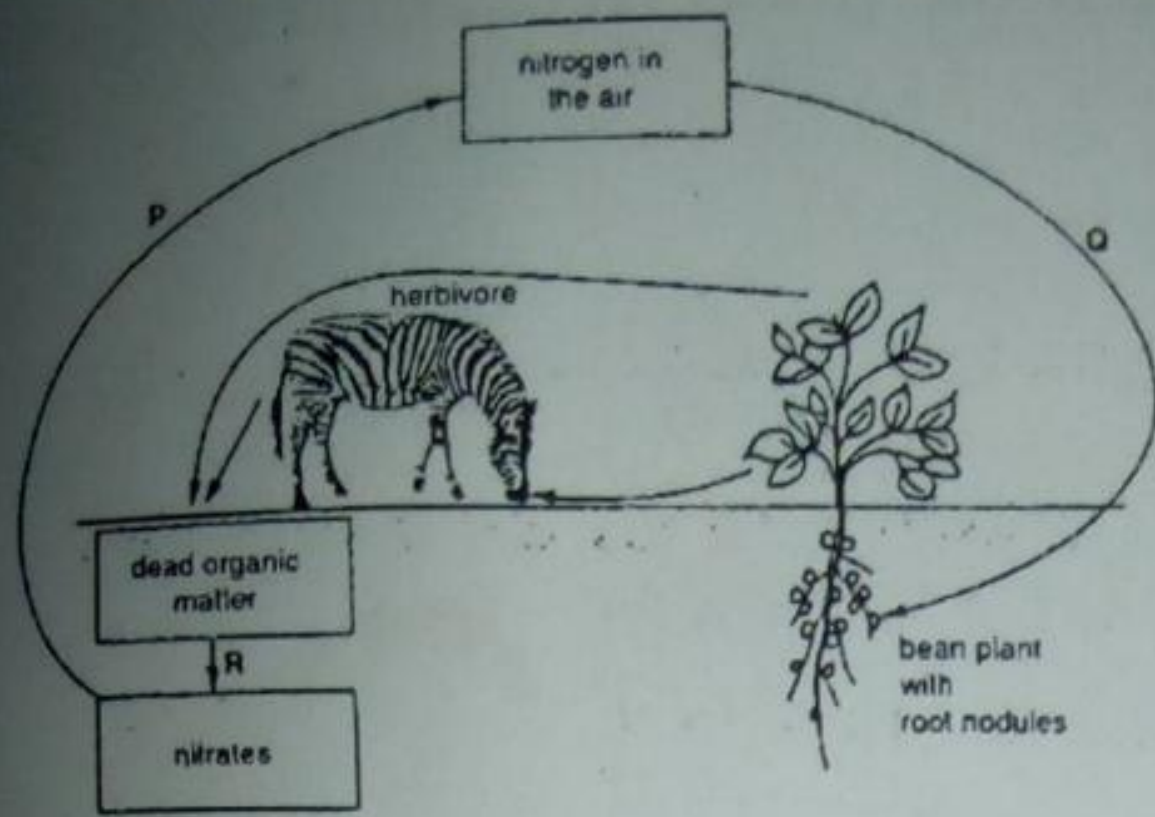
	conditions		observations	
Group	Soil treatment	Nitrates added	Nodules developed in roots	Average stem height/cm
1	Sterilized	No	No	10
2	Not sterilized	Yes	No	30
3	Not sterilized	No	Yes	30
4	Sterilized	Yes	?	?

Which results could have been obtained for plants in group 4?

D

	Nodules developed on roots	Average stem height/cm
A	Yes	10
B	Yes	30
C	No	10
D	No	30

3. The diagram shows part of the nitrogen cycle. Which arrows identify nitrogen fixation and denitrification.



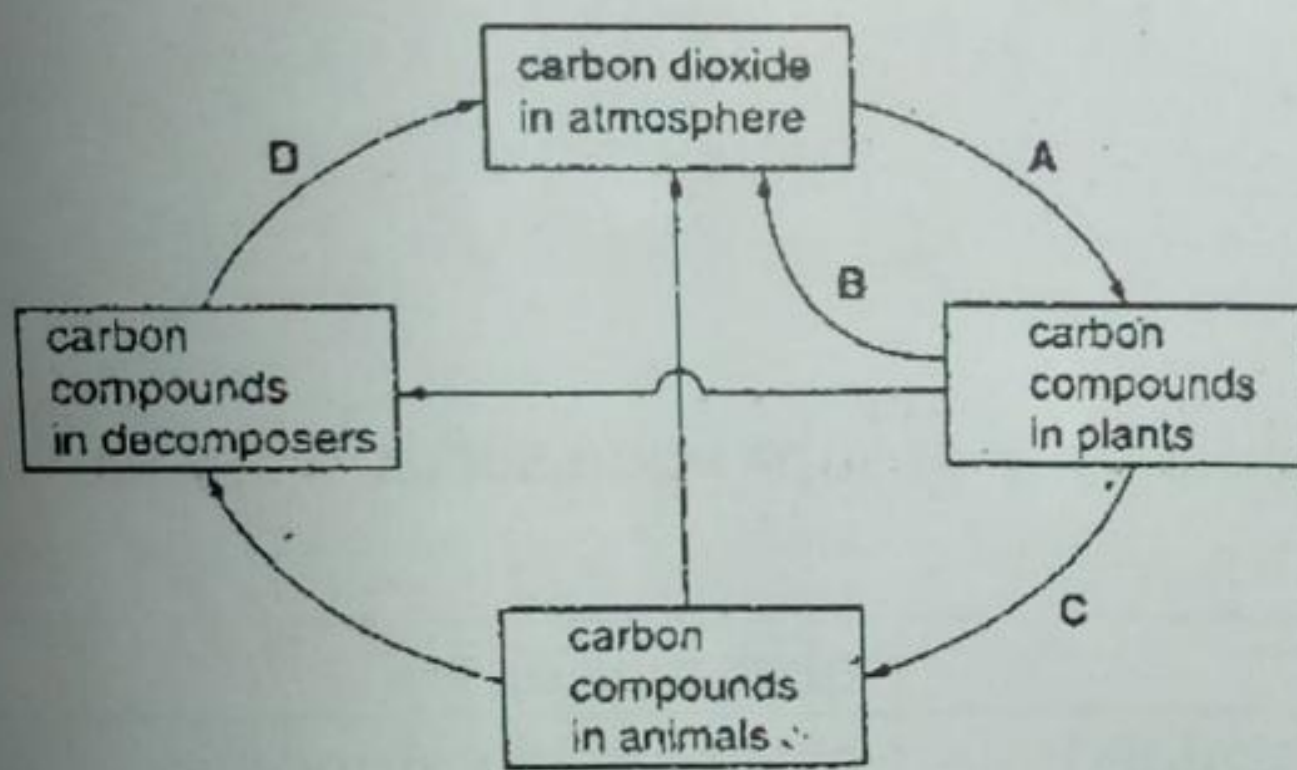
Nitrogen fixation

Denitrification

- | | | |
|----|---|---|
| A. | P | Q |
| B. | P | R |
| C. | Q | P |
| D. | Q | R |

C

4. The diagram shows the carbon cycle. Which process causes the largest amount of carbon to be converted from one form to another A



5. Which bacteria process returns nitrogen to the air?
 A. Decay
 B. Denitrification B
 C. Nitrification
 D. Nitrogen fixation
6. Which process does NOT result in the return of carbon dioxide to the atmosphere?
 A. Combustion of fossil fuels
 B. Decomposition of humus
 C. Respiration by bacteria
 D. Photosynthesis by green plants D

Parasitism

1. The following samples are taken from a human patient. Which sample will be examined to find out whether the patient is infected with malarial parasite?
 A. Red blood cells

D. Discontinuous

discontinuous

6. Which of the following correctly describes the chromosomes in the eggs of a woman?
- A. 22 chromosomes and one X chromosome
 - B. 22 chromosomes and two X chromosomes
 - C. 22 pairs of chromosomes and one X chromosome
 - D. 22 pairs of chromosomes and two X chromosomes

A

7. In peas, the allele S, for smooth seeds, is dominant over s for wrinkled seeds. 200 homozygous plants were self-pollinated and 1500 smooth seeds were collected. How many wrinkled seeds were collected?

- A. 600
- B. 2000
- C. 1500
- D. 500

A

8. A child has blood group O. which couple could be parents to this child?

	Blood group father	Phenotype mother
A	A	B
B	AB	B
C	O	AB
D	AB	A

C

9. For a pair of alleles, H and h, what would be the genotype(s) of the offspring of a cross between a homozygous dominant parent and a homozygous recessive parent?

- A. All Hh
- B. 50% HH, 50% hh
- C. 50%Hh, 50%hh
- D. 25%HH, 50%Hh, 25% hh

C

10. In mice, a chromosome may carry a recessive allele, which causes death if present in a homozygous animal. Two mice carrying this allele are mated. Which proportion of their living offspring will carry this allele?

- A. 0.00
- B. 0.25
- C. 0.50
- D. 0.67

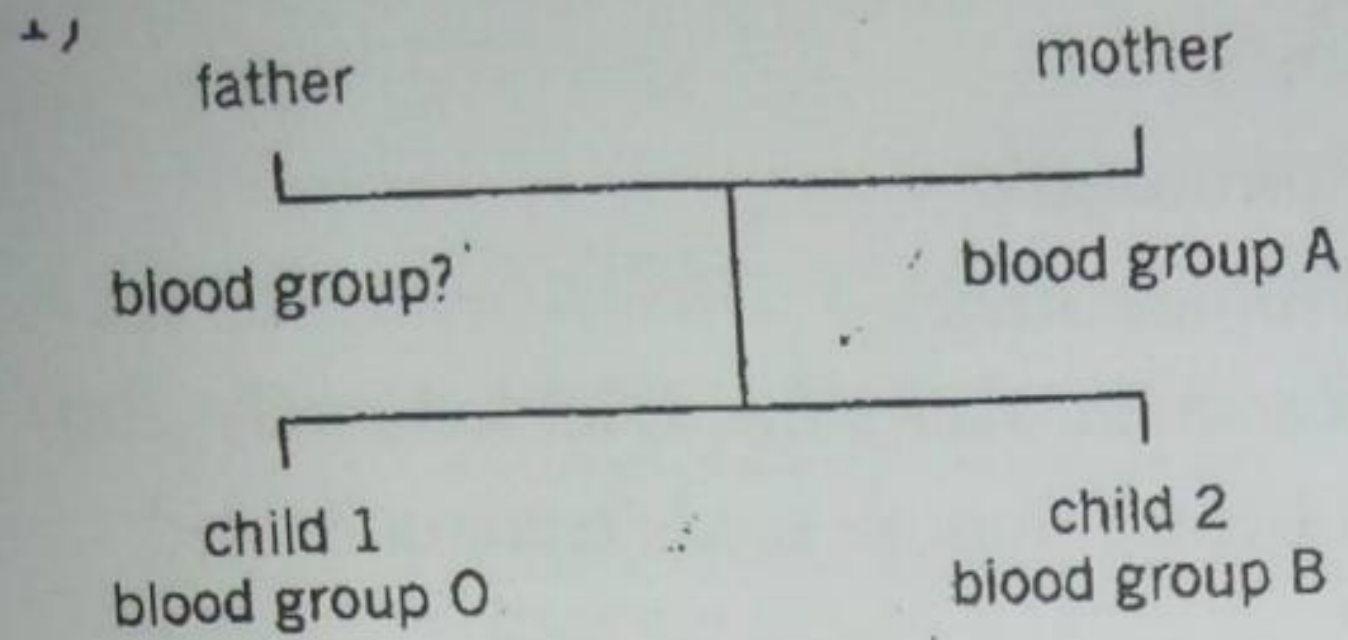
C

11. In fruit-flies the allele for long wings, A is dominant and allele for short wings, a is recessive. 20 heterozygous long-winged flies were mated with 20 short-winged flies. 210 of the offspring had long wings. How many short-winged offspring are likely to have been produced?

- A. 70
- B. 105
- C. 210
- D. 420

C

12. The diagram shows blood group phenotypes for a mother and her two children. What is the blood group genotype of the father?



- A. $I^A I^B$
- B. $I^A I^O$
- C. $I^B I^O$
- D. $I^O I^O$

D

13. Which word describes the alternative forms of a factor controlling a particular characteristic?

- A. Allele
- B. Chromosomes
- C. Genes
- D. Genotypes

B

14. Human gametes normally contain 23 chromosomes. How many chromosomes does a zygote which develops into a Down's syndrome baby contain?

- A. 23
- B. 24
- C. 46
- D. 47

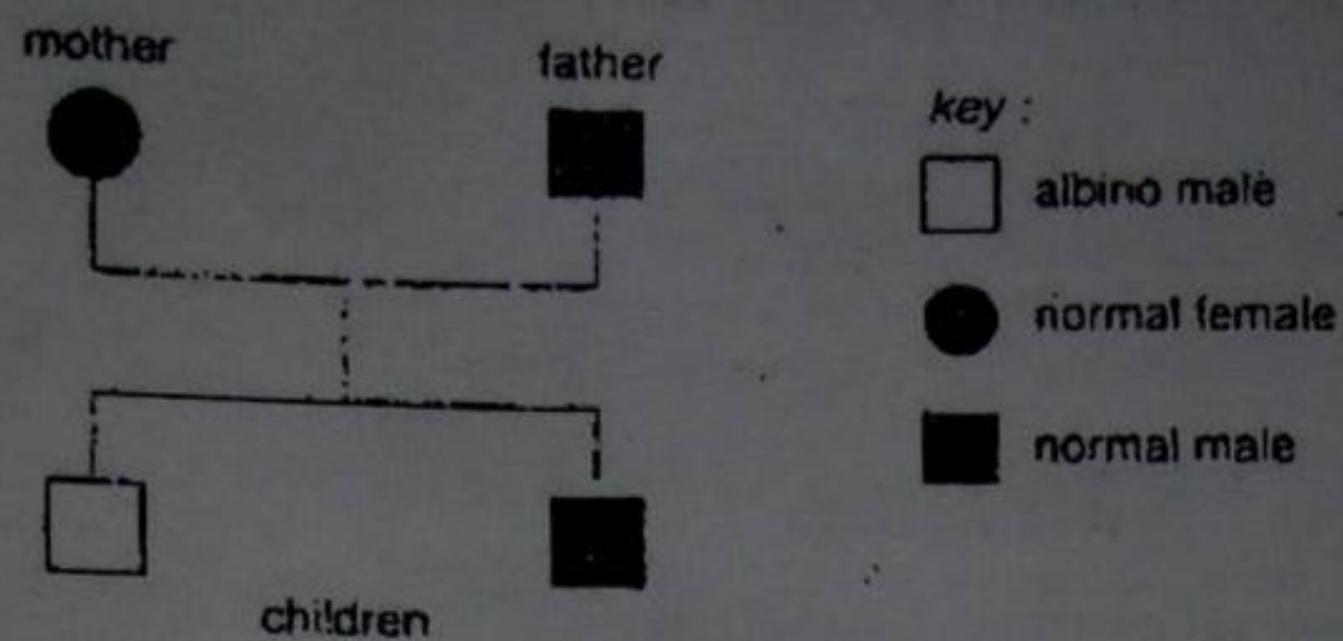
D

15. In cats, the gene for folded ear is dominant to the gene for normal ear. Over a period of years, two cats, which were heterozygous for the gene, produced a total of 120 kittens. What would be the ratio of folded ear to normal ear amongst these off springs?

- A. 30:90
- B. 60:60
- C. 80:40
- D. 90:30

D

16. The diagram shows the inheritance of albinism in a family. Albinism is caused by a recessive allele. What are the genotypes of the parents?



Mother

Father

- | | |
|-------------------------|----------------------|
| A. Heterozygous | heterozygous |
| B. Heterozygous | heterozygous |
| C. Homozygous dominant | heterozygous |
| D. Homozygous recessive | homozygous recessive |

17. A child has blood group A. her mother's blood group is O. which blood groups could her father have?
- A. A or B
- B. A or AB
- C. AB or O
- D. B or AB
18. Which of the following is not an example of discontinuous variation?
- A. Blood group
- B. Height
- C. Intelligence
- D. Weight
19. Which statement about human sex cells is correct?
- A. All egg cells contain one X chromosome
- B. All egg cells contain two X chromosomes
- C. All sperm cells contain one X chromosome
- D. All sperm cells contain two Y chromosome
20. In a genetic experiment using smooth and wrinkled peas, results showed that the allele for smooth peas was dominant(S) and that for wrinkled peas was recessive (s). 250 hybrid plants (Ss) were crossed and 6000 smooth peas were gathered in the F₁ generation. What is likely number of wrinkled peas gathered?
- A. 1500
- B. 2000
- C. 3000
- D. 4500
21. A recessive allele in cats causes kittens to develop six toes instead of the normal five. A cat heterozygous for this gene was crossed with a homozygous recessive individual. What is the chance of any one of their kittens having six toes?

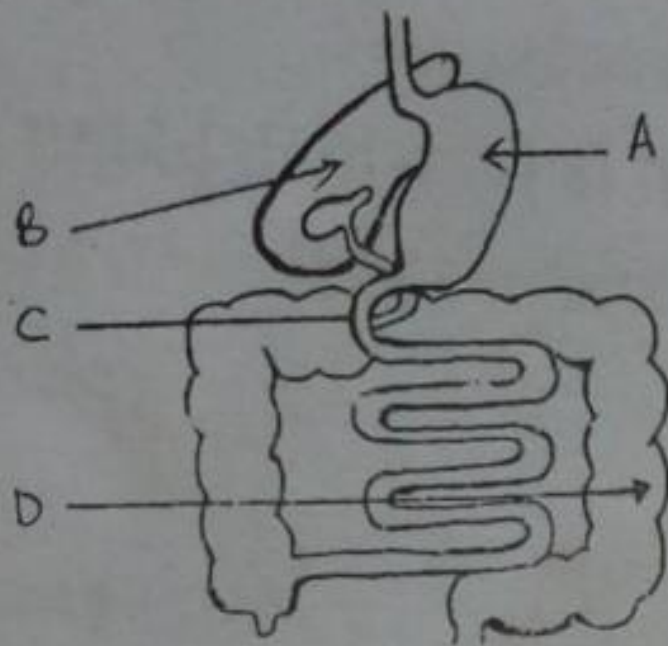
- B. 50%
- C. 75%
- D. 100%

B

Digestion / Nutrition

1. Which of these is NOT a function of the digestive system?
 - A. Eliminating wastes
 - B. Absorbing nutrients
 - C. Digesting food
 - D. Regulating metabolism
2. The diagram shows part of the alimentary canal.

D

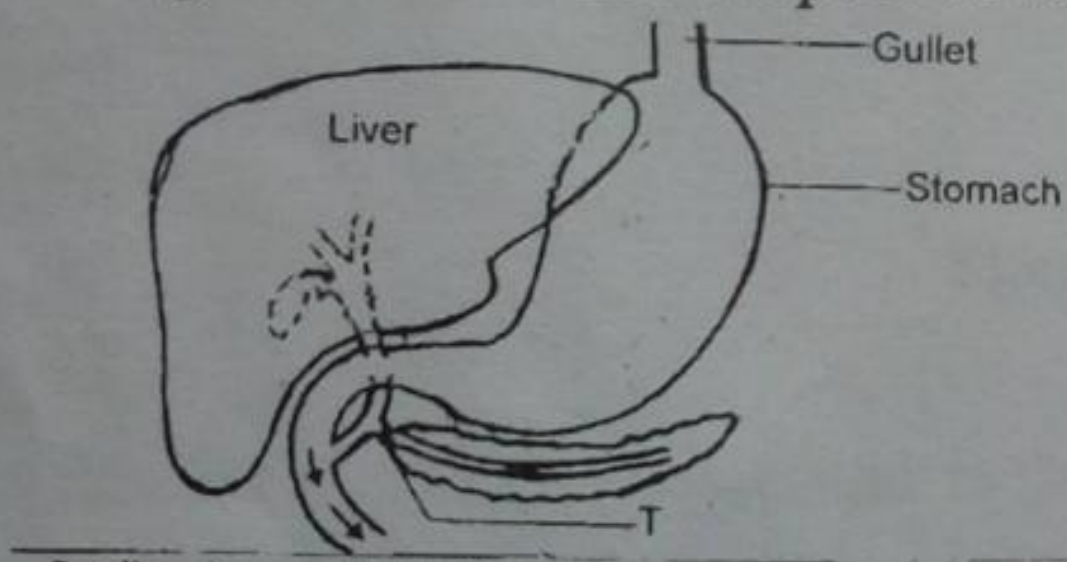


An enzyme works under the following conditions

A

Food acted upon	Temperature	pH
Polypeptides	37°C	7

3. The diagram below shows part of the mammalian alimentary canal.



What would be the effect on body if there was a blockage at point T?

- A. Fat digestion would stop
 - B. Fat digestion would slow down
 - C. No insulin would be released
 - D. Fat digestion would increase
4. Salivary glands in your mouth produce _____ an enzyme that breaks down starches.
 - A. Saliva
 - B. Amylase
 - C. Pepsin
 - D. Bile

C

B

5. Which molecules are produced by the digestion of starch and of protein?

	Starch	Protein
A	Glycerol	Amino acids
B	Glycerol	Fatty acids
C	Sugar	Amino acids
D	Sugar	Fatty acids

C

6. Which secretion does NOT contain digestive enzymes?

- A. Bile
- B. Gastric juice
- C. Intestinal juice
- D. Pancreatic juice

A

7. The recommended diet for soldiers in Arctic conditions is different from that recommended for tropical conditions. What should the Arctic diet include?

- A. More fat
- B. More fibre
- C. More vitamins
- D. More water

A

8. Which region of the alimentary canal has the greatest internal surface area?

- A. Colon
- B. Duodenum
- C. Ileum
- D. Stomach

C

9. In the human body, where is bile stored?

- A. Gall bladder
- B. Liver
- C. Pancreas
- D. Stomach

A

10. Lipase solution was added to milk. After 30 minutes, the milk had become more acidic. Where were the substrate and product in this reaction?

- | Substrate | Product |
|------------------|----------------|
| A. Fats | amino acids |
| B. Fats | fatty acids |
| C. Proteins | amino acids |
| D. Proteins | fatty acids |

B

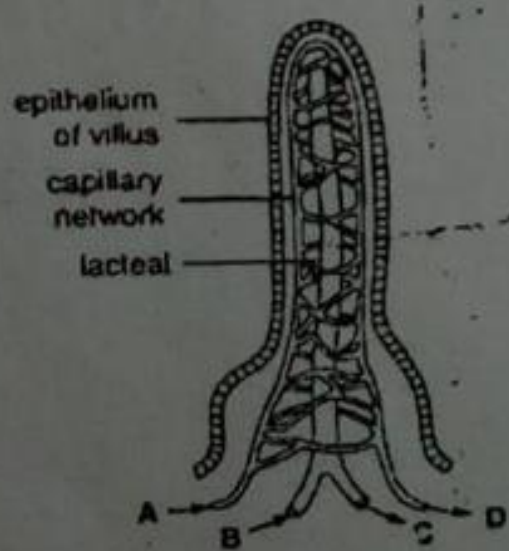
11. The table shows the protein, fat and carbohydrate content in 10g of rice and white fish.

Food	Protein/g	Fat/g	Carbohydrates/g
Rice	0.6	0.1	8.7
White fish	1.6	0.005	0.0

What would be the main end products of digestion of rice and white fish?

- A. Amino acids and glycerol

- B. Amino acids and simple sugars
 C. Fatty acids and simple sugars
 D. Simple sugars and glycerol
12. Which component of a balanced diet is used to make new enzyme molecules?
 A. Carbohydrates
 B. Fats
 C. Proteins
 D. Water
13. Which food contains the highest concentrations of calcium and vitamin D?
 A. Bread
 B. Fresh vegetables
 C. Meat
 D. Milk powder
14. As food passes along the alimentary canal, proteins are digested in the
 A. Duodenum, ileum and liver
 B. Ilium, liver and colon
 C. Mouth, stomach and duodenum
 D. Stomach, duodenum and ileum
15. The diagram shows the structure of a villus in the small intestine. The arrows show the direction of flow of fluids. Where will fatty acids and glycerol be present in the largest amounts?



16. What would happen if a person's bile duct became blocked?
 A. Carbohydrate digestion would be reduced
 B. Fat digestion would be reduced
 C. Protein digestion would slow down
 D. The duodenum contents would be neutralized more quickly
17. Which of the following breaks down fat molecules into fatty acids and glycerol?
 A. Amino acids
 B. Amylase
 C. Lipase
 D. Protease
18. In the human body, where is bile produced?
 A. Gall bladder

- B. Liver
- C. Pancreas
- D. stomach

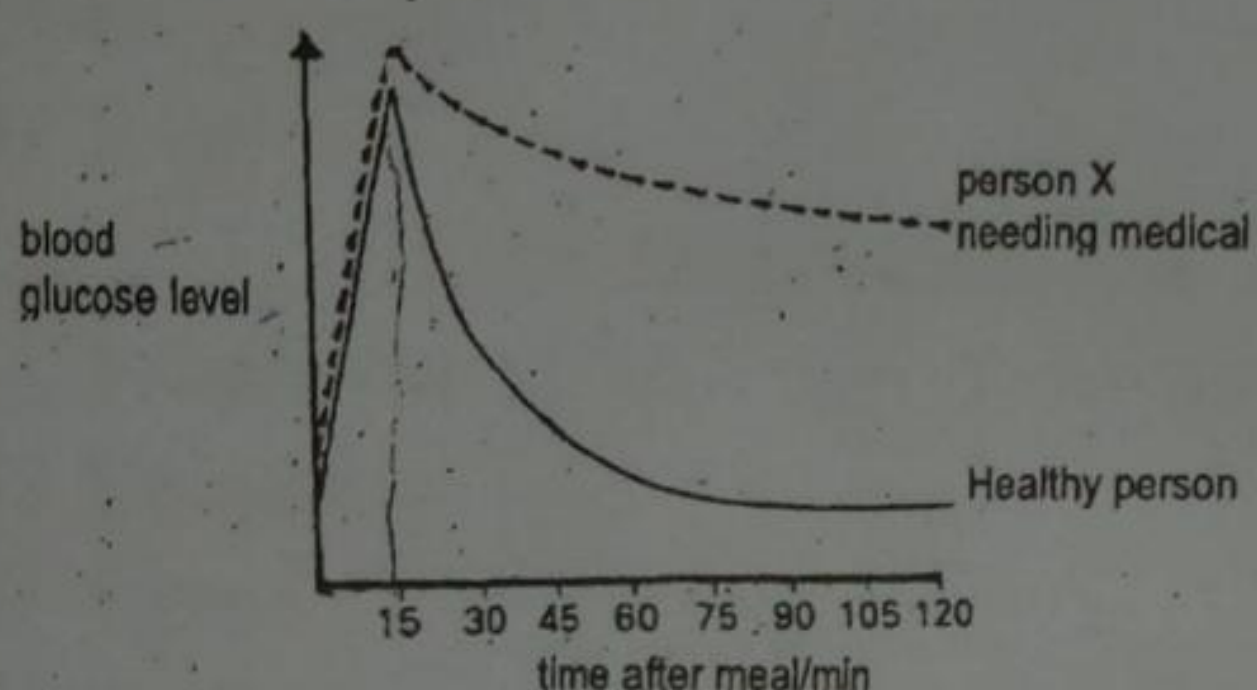
B

19. Which of these is an example of mechanical digestion?

- A. Peristalsis
- B. Coughing
- C. Chewing
- D. Epiglottis

C

20. The graph shows changes in the blood sugar levels of two people after eating identical meals.



The correct medical treatment for person X would be...

- A. Blood transfusion
- B. Insulin injection
- C. Extra vitamin in the diet
- D. Dialysis by a kidney machine

B

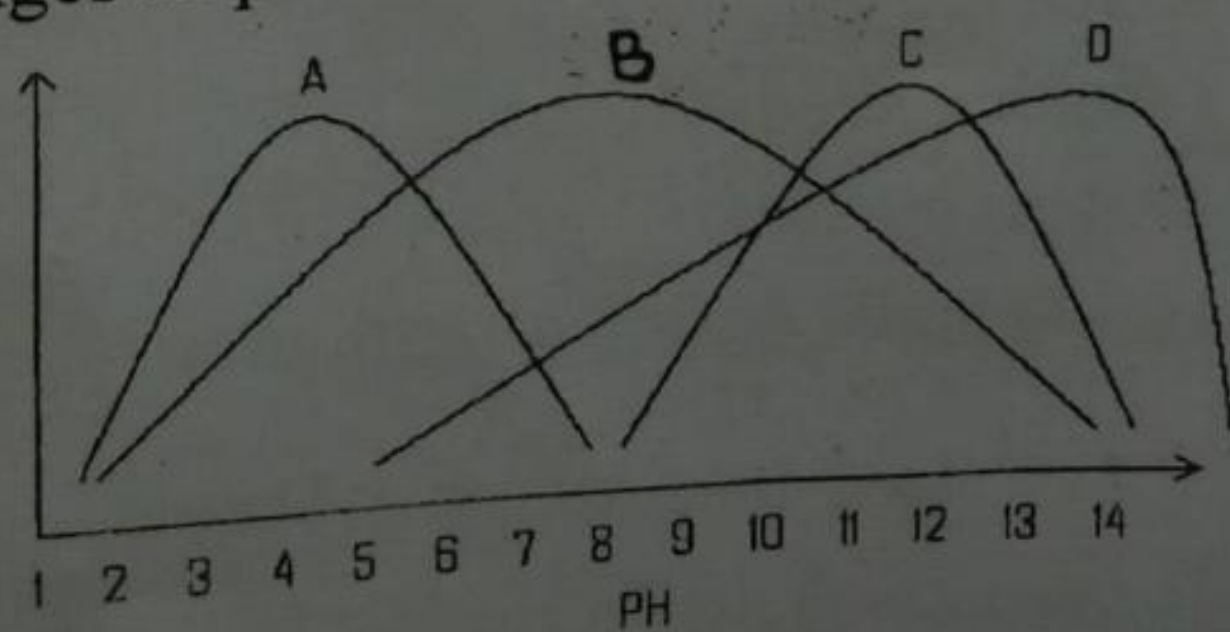
21. The _____ is a muscular tube that connects the mouth to the stomach:

- A. Esophagus
- B. Epiglottis
- C. Palate
- D. Tongue

B

22. An enzyme has an optimum pH value of 8. Which graph shows how its activity will vary with changes in pH?

B



23. 24g of sucrose was mixed with a solution of sucrose. After 30 minutes at 10⁰C, 4g was hydrolyzed to monosaccharides. The experiment was repeated at 20⁰C. How much sucrose was hydrolyzed in the second experiment?

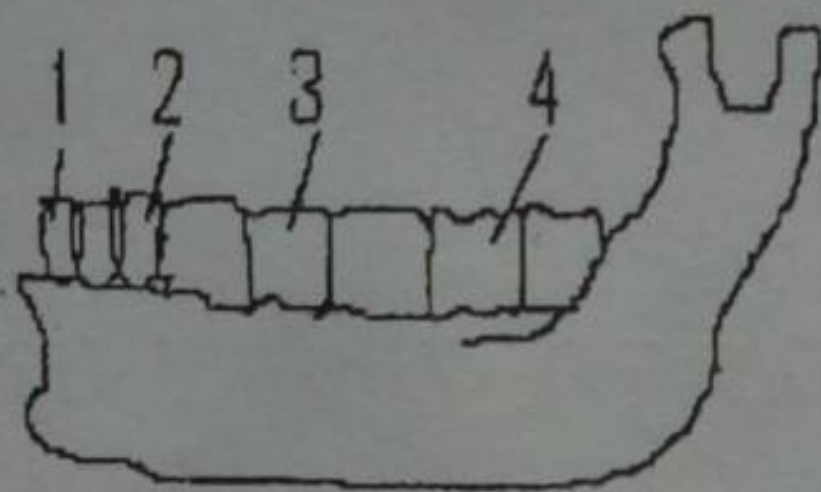
- A. 8g
- B. 24g

- C. 6g
- D. 20g

24. What enzyme, substrate and conditions are needed for the digestion of food in the mouth?

Substrate	Enzyme	Conditions
A. Protein	pepsin	acidic
B. Protein	trypsin	alkaline
C. Fats	lipase	alkaline
D. Starch	amylase	alkaline

25. The diagram shows a human lower jaw.



What are the numbered types of teeth?

1	2	3	4
A. Canine	incisor	molar	premolar
B. Canine	incisor	premolar	molar
C. Incisor	canine	premolar	molar
D. Incisor	canine	molar	premolar

26. In which of the following are fats (lipids) digested?

- A. Colon
- B. Small intestine
- C. Pancreas
- D. Liver

27. A sample of egg albumen solution was tested using the biuret test. Which of the following shows the result of the test and the conclusion that can be made?

Result	Conclusion
A. Blue-black colour	protein present
B. Blue-black colour	starch present
C. Purple colour	reducing sugar present
D. Purple colour	protein present

28. How does the liver deal with excess amino acids during assimilation?

- A. It changes and them, to glycogen
- B. It stores them
- C. It deaminates them
- D. It converts them to proteins

29. Which of the following are disorders of the liver?

- A. Hepatitis and hepatomegaly
- B. Bronchitis and cirrhosis

- C. Arthritis and bronchitis
- D. Diarrhea and constipation

A

30. Which of the following secretions of the alimentary canal has no digestive enzyme?

- A. Saliva
- B. Gastric juice
- C. Intestinal juice
- D. Bile

D

31. What part of tooth has a composition similar to bones?

- A. Enamel
- B. Dentine
- C. Pulp cavity
- D. Root

A

32. The _____ prevents swallowed food from entering the windpipe.

- A. Esophagus
- B. Epiglottis
- C. Palate
- D. Tongue

B

8. Which of the following digestive processes take(s) place in the stomach?

	Chemical digestion	Physical digestion
A	✓	✓
B	✓	X
C	X	✓
D	X	X

A

9. The table below shows the results of experiments in which mixtures shown in the table were tested with

- (i) Benedict solution
- (ii) Iodine solution

Each mixture was made, and then kept cool at room temperature for ten minutes before testing.

	Mixture	Colour of mixture after testing with Benedict solution	Colour of mixture after testing with iodine solution
X	Saliva + Water	Blue	Brown
Y	Starch + Water	Blue	Black
Z	Saliva + Starch + Water		

What would be the result for mixture Z?

Colour of mixture after testing with Benedict solution	Colour of mixture after testing with iodine solution
A. Blue	Black
B. Blue	Brown
C. Red	Black
D. Red	Brown

10. An analysis of the contents of a food container is shown below.

Protein	11.0%
Carbohydrates	62.4%
Fat	7.0
Minerals and vitamins	19.6

Which of these included any sugar which may be present?

- A. Protein
- B. Carbohydrates
- C. Fat
- D. Minerals and Vitamins

B

11. Even if you were standing on your head, this process would move food along your digestive tract.

- A. Peristalsis
- B. Swallowing
- C. Secretion
- D. Absorption

A

12. What is the pH of your stomach during digestion?

- A. 2
- B. 4
- C. 6
- D. 8

A

13. The first 25 cm of the small intestine is known as the

- A. Pancreas
- B. Duodenum
- C. Gallbladder
- D. Rectum

B

14. Digested food is absorbed in small intestine by what structures?

- A. The epiglottis
- B. Tonsils
- C. Villi
- D. Sphincters

C

15. Which of these enzymes functions best in the acid Ph of the stomach?

- A. Lipase
- B. Lactase
- C. Pepsin
- D. Amylase

C

16. Of these, which organ is NOT directly involved in digestion?

- A. Lung
- B. Pancreas

A

- C. Liver
D. Duodenum
17. What is the primary function of the large intestine?
A. Nutrient absorption
B. Food digestion
C. Vitamin synthesis
D. Water absorption D
18. When your body needs energy, it breaks down _____ and releases sugar into the blood stream.
A. Calcium
B. Glycogen B
C. Glucogon
D. Insulin
19. The pancreas functions as (n) _____ gland
A. Exocrine
B. Endocrine A
C. Digestion
D. All of these
20. Hormones release by endocrine glands affect specific body cells known as
A. Body fluid
B. Lymph glands
C. Target tissues C
D. Epithelium
21. Which of these is NOT a function of the thyroid glands?
A. Regulates blood glucose levels
B. Regulates development
C. Regulates metabolism A
D. Regulates nervous system
22. What is used to measure the energy contents of food?
A. Temperature
B. Grams
C. Calorie C
D. Mass
23. A(n) _____ is an inorganic substance that serves as building material or take part in chemical reactions in the body.
A. Enzymes
B. Mineral B
C. Calorie
24. What is the most abundant molecule in the human body?
A. Carbohydrates

- B. Vitamins
- C. Water
- D. Proteins

25. Which of the following contains taste receptors?

- A. The cheek
- B. The taste buds
- C. The taste palate
- D. The tonsils

C
B

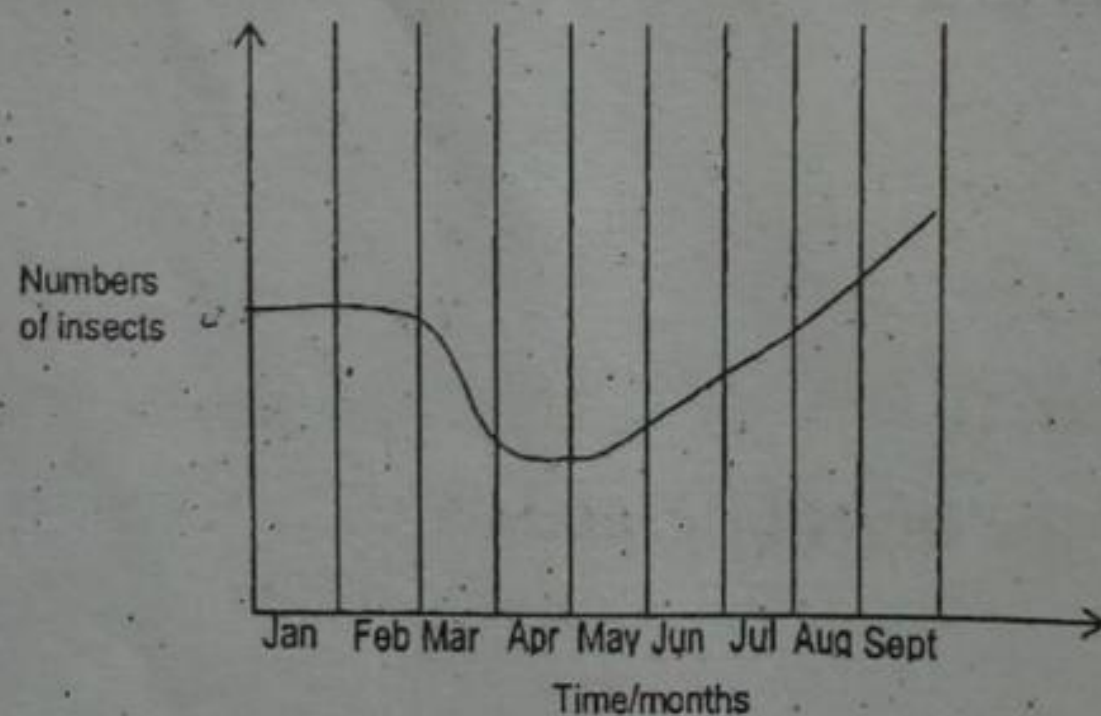
Ecology

1. Living organisms that inhabit an environment are called

- A. Abiotic factors
- B. Biotic factors
- C. Fungi
- D. Bacteria

B

2. The graph below shows changes in the number of a species of insects when an insecticide was sprayed on a crop.



During which month was the crop sprayed?

- A. March
- B. May
- C. June
- D. September

A

3. What is a long-term effect of cutting down large areas of rain forests?

- A. Decreased carbon dioxide content in the air
- B. Decreased flooding of low-lying land
- C. Increased rainfall in these areas
- D. Increased rate of soil erosion

D

4. Some possible properties of modern insecticides are listed below. When these insecticides are used, what property helps to keep environmental pollution at the lowest level?

- A. Accumulate in the bodies of predators

- B. Broken down by soil bacteria
 C. Easily washed into lakes and rivers
 D. Taken up by plant roots B
5. A lake has been polluted by sewage. Compared with unpolluted water, the water in this lake will have
 A. Fewer bacteria
 B. More fish C
 C. More nitrogen compounds
 D. More oxygen

6. The table shows the level of oxygen, numbers of green plants and of fish, in rivers flowing through four towns. Which is most likely to be discharged untreated sewage?

Town	Oxygen level	Green plant	Fish
A.	High	few	many
B.	High	many	many
C.	Low	few	few
D.	Low	many	few

D

7. Rats eat eggs from the nests of seabirds which feed on fish. If poison is used to control the rats, what will be the effects on the number of seabirds and fish?

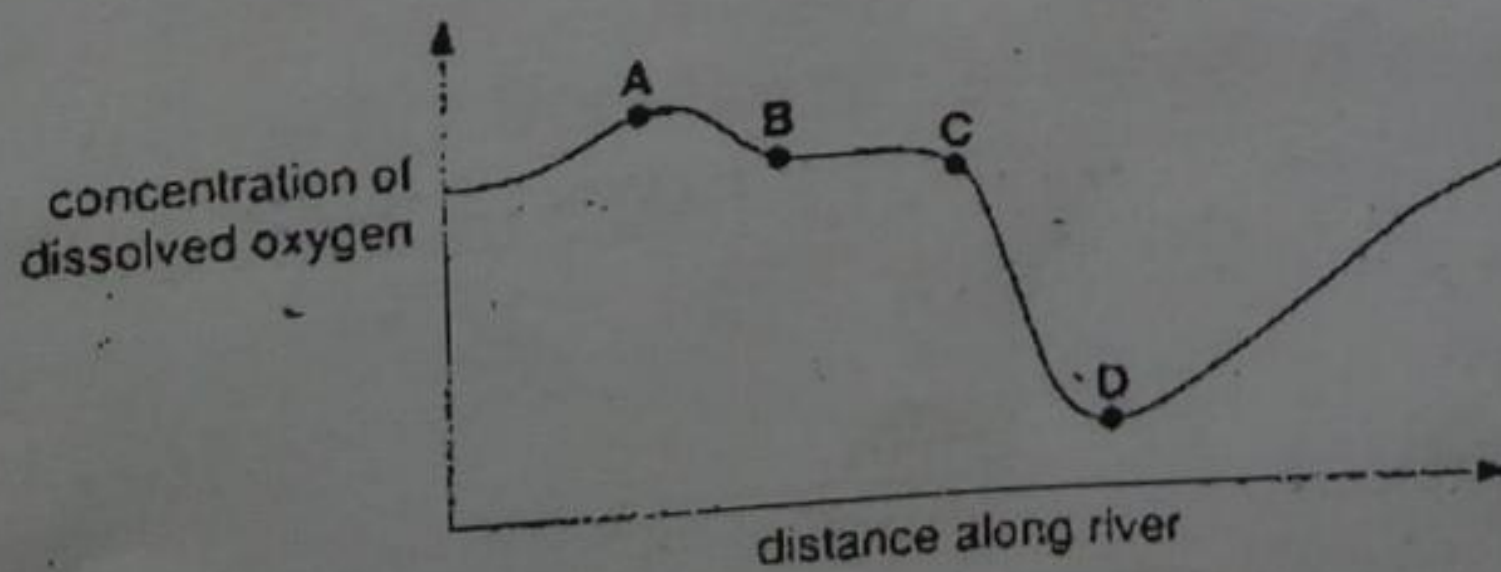
Seabirds	Fish
A. Decrease	decrease
B. Decrease	increase
C. Increase	decrease
D. Increase	increase

C

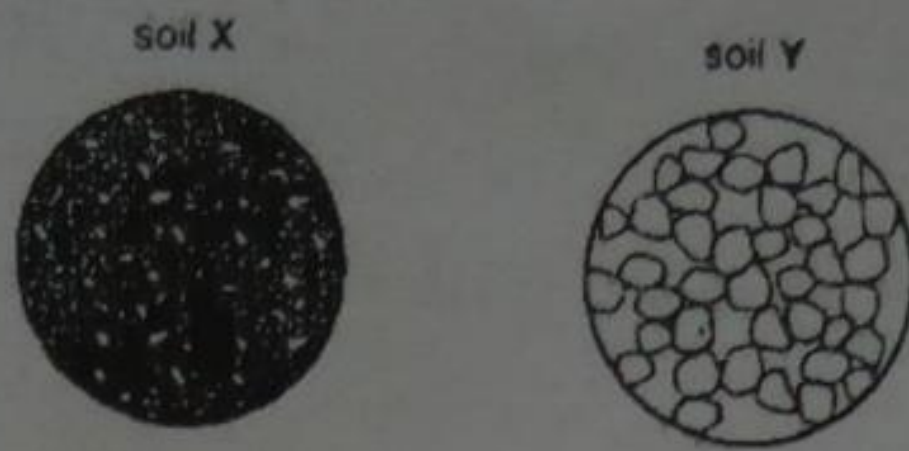
8. Which of the following is a likely result of a large scale destruction of forests?

- A. Increase in soil erosion
 B. Increase in air humidity A
 C. Decrease in the risk of flooding
 D. Decrease in the carbon dioxide content of the river

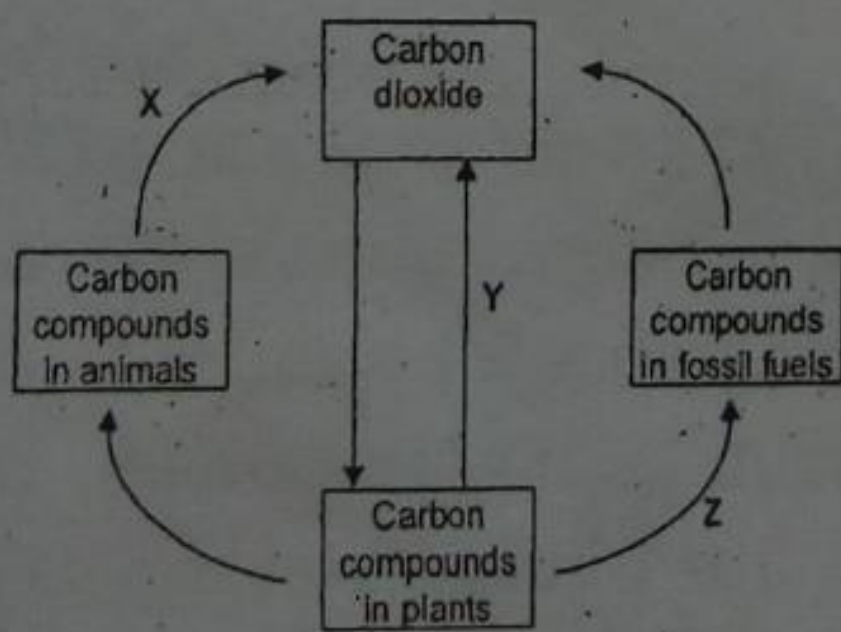
9. The graph shows the concentration of dissolved oxygen along the river. At which point is sewage emptied into the river?



10. The diagram shows the appearance of two soil samples at the same magnification, as seen under a microscope. What characteristic will soil Y have compared to soil X? C



- A. Increased drainage
 B. Increased humus content
 C. Reduced air content
 D. Reduced temperature changes
11. Which component of a fertile soil is reduced as the result of burning crops?
 A. Calcium
 B. Clay
 C. Humus
 D. Sand
12. All of the following are good examples of abiotic factors except.
 A. Temperature
 B. Moisture
 C. Light
 D. Fungi
13. Besides food, which of the following is the most valuable plant product?
 A. Wood
 B. Medicine
 C. Gum
 D. Latex
14. Non-living organisms that inhibit an environment are called.
 A. Biotic factors
 B. Abiotic factors
 C. Fungi
 D. Bacteria
15. The diagram shows the carbon cycle.



Identify the processes marked X, Y and Z.

X

Y

Z

D

- A. Photosynthesis
- B. Photosynthesis
- C. Respiration
- D. Respiration

- Respiration
- Combustion
- Photosynthesis
- Respiration

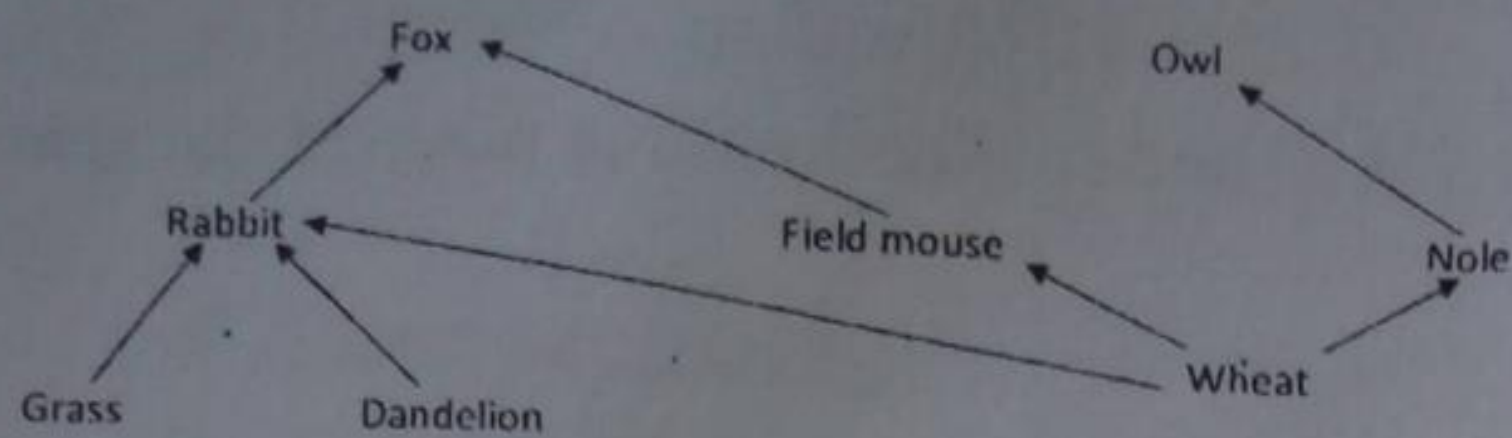
- Decomposition
- Decomposition
- Fossilisation
- Fossilisation

16. A group of organisms of one species that interbreed and live in the same place at the same time is called.
- A. Community
 - B. Population B
 - C. Habitat
 - D. Niche
17. A collection of interacting populations is called
- A. Population
 - B. Community B
 - C. Habitat
 - D. Niche
18. The role a species plays in a community is called
- A. Niche
 - B. Respiration A
 - C. Photosynthesis
 - D. Metabolism
19. Production of oxygen by green plants during photosynthesis and production of carbon dioxide by the breaking of organic materials by bacteria and fungi are both examples of.
- A. Photosynthesis
 - B. Niche
 - C. Anabolism B
 - D. Catabolism
20. The place where an organism lives out its life is called
- A. Habitat
 - B. Grassland
 - C. Ecosystem A
 - D. Community
21. Organisms that use energy from the sun or energy stored in chemical compounds to manufacture their food are called
- A. Autotrophs
 - B. Heterotrophs A
 - C. Decomposers
 - D. Scavengers
22. Organisms that break down and absorb nutrients from dead organisms are called
- A. Scavengers
 - B. Decomposers B

C. Parasites

D. Autotrophs

23. The diagram below shows a food web.



Which organisms are autotrophic?

A. Wheat, Rabbit and Field mouse

B. Field mouse, Dandelion and Grass

C. Grass, Wheat and Dandelion

D. Rabbit, Dandelion and Field mouse

24. As energy flows through an ecosystem, at each level it

A. Remains the same

B. Increases

C. Fluctuates

D. Decreases

25. Which chemical cycle includes lightening and bacteria

A. Carbon

B. Phosphate

C. Water

D. Nitrogen

26. Each organism in a food chain represents

A. Trophic level

B. Consumer

C. Pyramid

D. Chemical cycle

27. Two organisms that benefit from close association are

A. Mutualistic

B. Commensalism

C. Parasite

D. Herbivores

28. A symbiotic relationship in which one organism harms the other is

A. Commensalism

B. Habitat

C. Parasitism

D. Mutualism

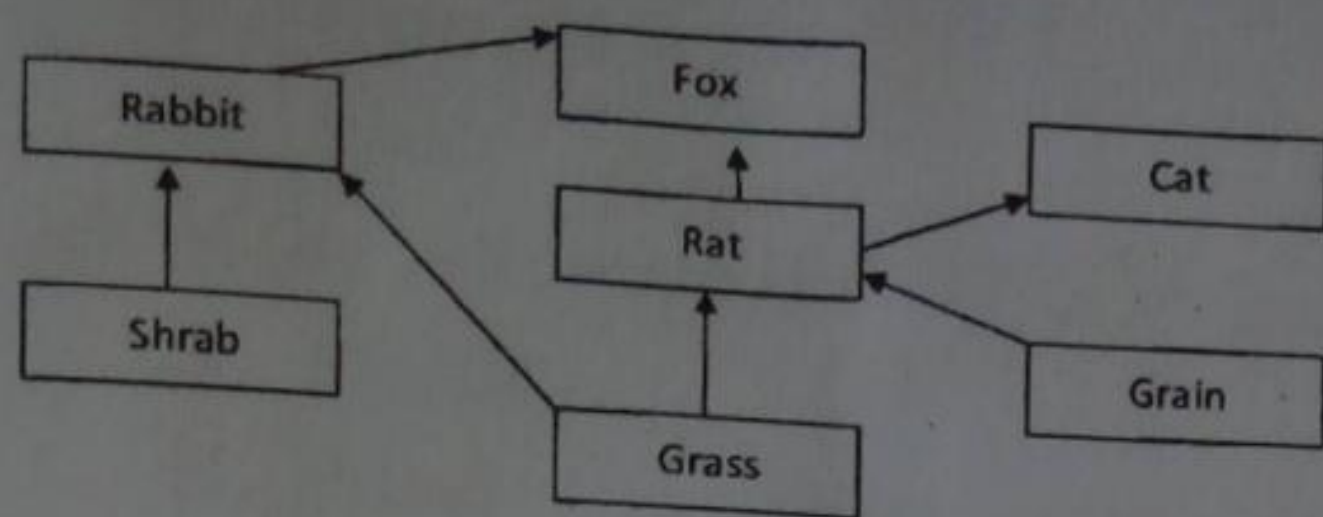
29. The close and permanent interaction between two organisms is called

A. Ecology

- B. Niche
- C. A trophic level
- D. Symbiosis

D

30. The diagram below shows a food web.



What would be the effect of the food if the foxes were killed by a disease?

The number of

- A. Rats would increase
- B. Rabbits would decrease
- C. Cats would decrease
- D. Grass would increase

B

31. In a carbon cycle, which of the following process does NOT return carbon dioxide to the atmosphere.

- A. Photosynthesis
- B. Decomposition
- C. Perspiration
- D. Combustion

A

32. Food webs are more realistic models than food chains because food webs describe

- A. An ecosystem
- B. More interaction
- C. Abiotic factors
- D. None of these

Population

1. Populations that grow at an ever increasing pace experience
 - A. Experimental growth
 - B. Exponential Growth
 - C. Straight – line growth
 - D. Unlimited growth
2. The highest level at which a population can be sustained is its
 - A. Carrying capacity
 - B. High-point maximum
 - C. Mid-range level
3. Resource use by most organisms increases as population
 - A. Remain steady

B

A

- B. Decrease in size
- C. Increase in size
- D. Migrate

B

Population limited by having members eaten experience.

- A. Predation
- B. Composition
- C. Carrying capacity
- D. Exponential growth

A

4. When population increase, resource depletion may cause

- A. Exponential growth
- B. Straight-line growth
- C. Competition
- D. Predators to increase

C

5. The study of population growth characteristic is

- A. Demography
- B. Ecology

A

- C. Growth strategy
- D. Age determination

6. Movement out of the community is termed as

- A. Population degeneration
- B. Immigration
- C. Population impact
- D. Emigration

D

7. One of the major stressors of a population is usually

- A. Reaching carrying capacity
- B. When stability is reached
- C. Caused by size decreases

C

8. Organisms that are small and have extreme population swings usually have a reproductive pattern exhibited by

- A. Slow growth
- B. Fast growth
- C. Stability
- D. Immigration

B

9. Which of the following environments would likely be more advantageous to an organism that exhibits fast growth?

- A. Desert
- B. Large, deep lake
- C. Intermittent
- D. Tropical rain forests

C

Pollution

1. Which of the following is a kind of air pollution?

- A. Fog
- B. Smog
- C. Rain pH 7
- D. Snow

A

2. Which of the following is NOT biodegradable?

- A. Plastic
- B. Paper
- C. Garbage
- D. Grass

A

3. Natural resources that can be replaced or recycled by natural processes are

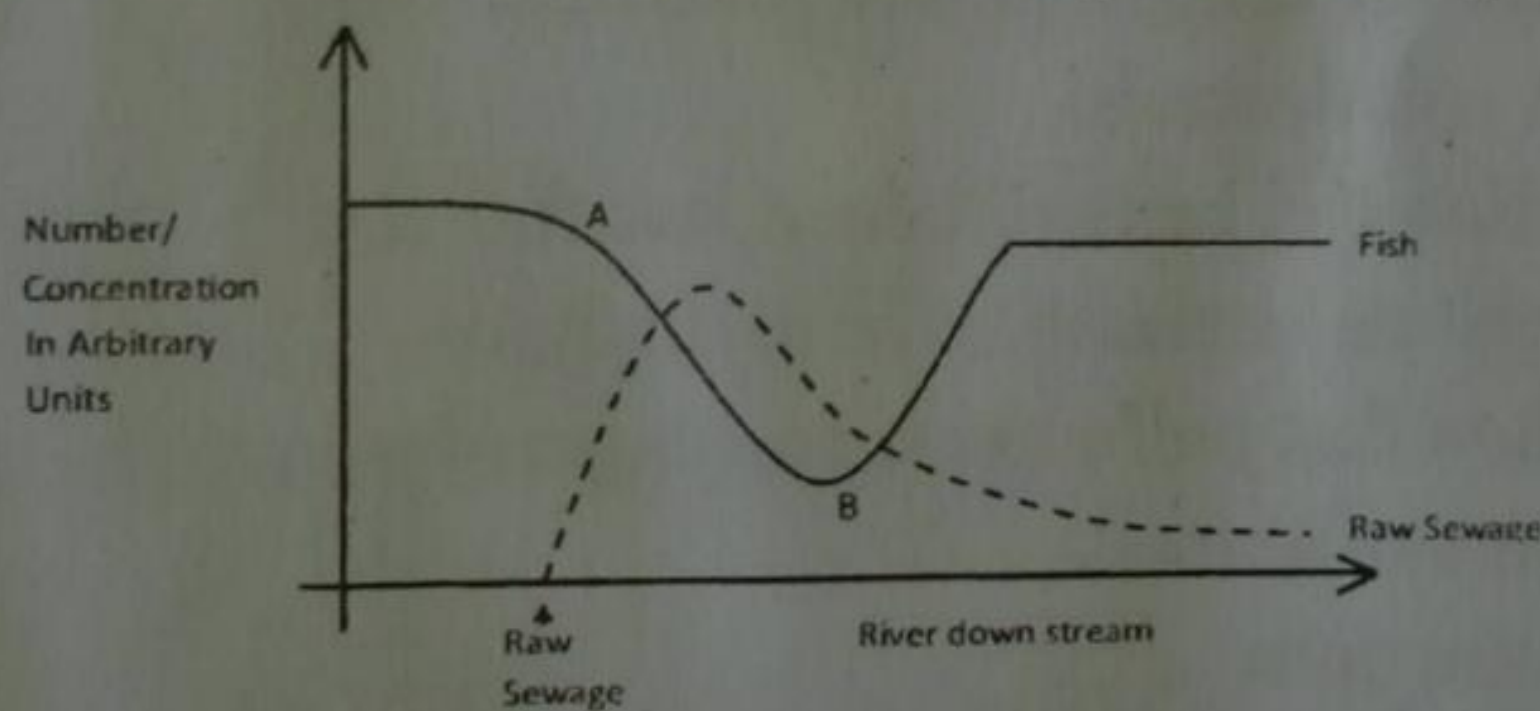
- A. Non biodegradable
- B. Biodegradable

B

C. Non recyclable

D. Limited

4. The diagram below shows the effect of adding raw sewage to a river.



What would have caused the reduction in fish between points A and B?

- A. Sewage killings
- B. Lack of food for fish
- C. Reduction in oxygen levels
- D. Reduction in nutrients for fish

C

5. Ultraviolet radiation reacting with nitrogen oxides and hydrocarbons from automobile exhausts results in

- A. Smog
- B. A rusty haze
- C. Rain
- D. Increased sunshine

A

6. Non renewable resources can be made to last longer by

- A. Increasing the use rate
- B. Increasing the availability
- C. Encouraging their use

A

- D. Increasing the price
7. Which of these is an effect of acid precipitation on sensitive ecosystem?
A. Increased fish production
B. Decreasing pH of lakes
C. Leaching of chemicals
D. Increased growth of plants
8. What would be the result of increasing participation in efforts to recycle metals, plastics, and paper?
A. Price would decrease
B. Resources would be conserved
C. Use would decrease
D. Increased biodegradable
9. How does agricultural runoff cause pollution?
A. Contaminates water supply
B. Kills crop plants
C. Increases pest insects
D. Decreases wildlife
10. Which of these is an effect of using aquifers for irrigation?
A. Salt levels in soil decrease
B. Crop production can be maintained indefinitely
C. Land may become unsuitable for agriculture
11. What may be an indication that pollution is causing a system to be out of balance?
A. Stable numbers of animals
B. Increased extinctions
C. Decreased extinctions
D. Stable numbers of plants
12. How do present extinction rates differ from past extinctions?
A. They are much higher
B. They are about the same
C. They are somewhat lower
D. They are much lower
13. What causes acid rain?
A. Increased ozone levels
B. Agricultural runoff
C. Living in areas with fog
D. Burning high sulfur coal
14. Contamination of any part of biosphere is called
A. Acid rain
B. Particulate generation

- C. Pollution
D. Pollination
15. Which nutrient derived from cattle manure is useful as an organic fertilizer?
A. Nitrogen
B. Methane
C. Water
D. Particulates
16. Suppose power plants switched from burning coal to using hydroelectric power. Which of these pollutants would be affected?
A. Carbon
B. Nitrogen
C. Sulfur
D. None of these

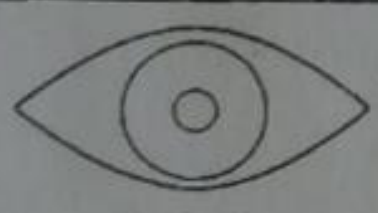



Cell reproduction

1. The _____ is the sequence of growth and division of a cell.
A. Centromere
B. Cell theory
C. Cell cycle
D. Surface area-to-volume ratio
2. The growth period of a cell is known as
A. Interphase
B. Mitosis
C. Prophase
D. Anaphase
3. Most of the cell's life is spent carrying on the activities of
A. The cell cycle
B. Interphase
C. Mitosis
D. Cell division
4. Chromosomes are made of
A. Cytoplasm
B. ATP
C. RNA
D. DNA
5. The process of nuclear division, followed by division of the cytoplasm, as known as
A. The cell cycle
B. Mitosis

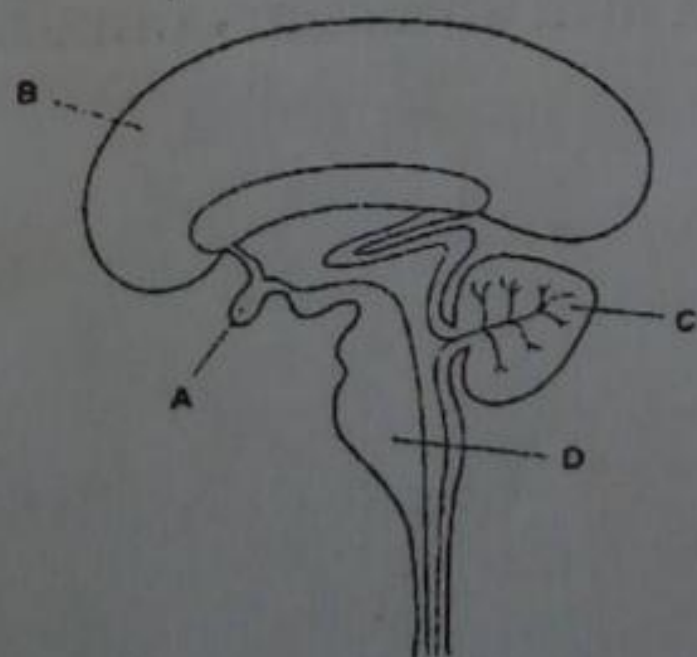
- C. Metaphase
D. Interphase
6. Which of the following does NOT occur during interphase?
A. Excretion of wastes
B. Cell repair
C. Protein synthesis
D. Nuclear division
7. Of the following, which is NOT a phase of mitosis?
A. Prophase
B. Metaphase
C. Interphase
D. Anaphase
8. During metaphase, the chromosomes move to the equator of the
A. Poles
B. Cell plate
C. Centrioles
D. Spindle
9. The separation of the sister chromatids marks the beginning of _____ in mitosis.
A. Anaphase
B. Telophase
C. Prophase
D. Metaphase
10. Structures inside cells that contain DNA and become darkly coloured when stained are
A. Centrioles
B. Centromeres
C. Centrosomes
D. Chromosomes
11. During which phase of the cell cycle are the chromosomes being doubled?
A. Interphase
B. Prophase
C. Metaphase
D. Anaphase
12. Plant cell division of the cytoplasm at the end of mitosis differs from animal cell division in that plants form a
A. Cell plate
B. Deep furrow
C. Centrioles pair
D. New plasma membrane

The nervous system

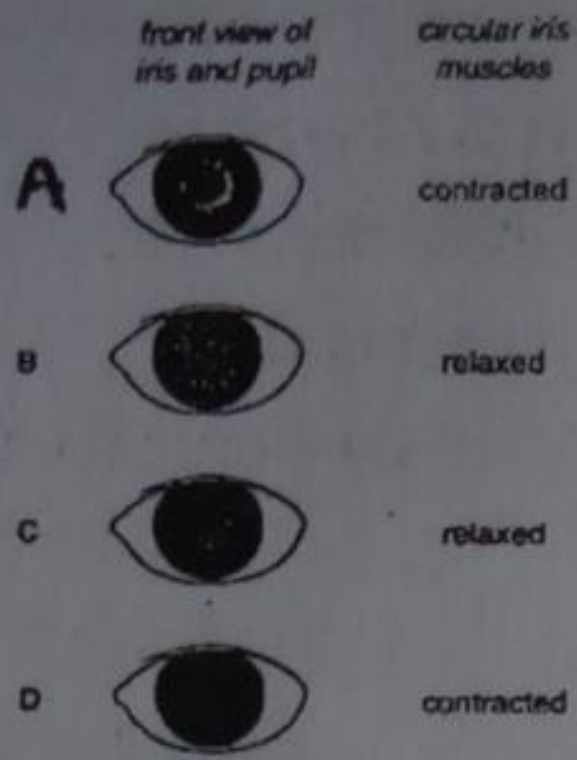
- Which of the following is NOT part of the brain?
 - A. Cerebrum
 - B. Cochlea
 - C. Cerebellum
 - D. Pons
- The basic unit of the structure and function in the nervous system is the
 - A. Schwann cell
 - B. Neuron
 - C. Axon
 - D. Dendrite
- Most axons are surrounded by a white covering called the _____ sheath.
 - A. Synapse
 - B. Neuron
 - C. Myelin
 - D. Dendrite
- What is the shape and size of the iris and pupil of the eye and the condition of the circular muscles of the iris, when viewing an object in bright light?

	front view of iris and pupil	condition of circular muscles of iris
A		contracted
B		contracted
C		relaxed
D		relaxed

- The diagram shows a vertical section through the human brain. Which structure controls balance and muscular co-ordination?



6. Which of the following shapes and sizes of the iris and pupil of the eye when viewing an object in bright light? A



7. The events listed occur during contraction of the pupil of the eye in response to increase light intensity.

1. Impulse pass along motor neuron
2. Contraction of circular iris muscle
3. Stimulation of the retina

What is the correct order of these events? D

	First \longrightarrow Last			
A	1	4	2	3
B	2	1	3	4
C	3	1	4	2
D	3	4	1	2

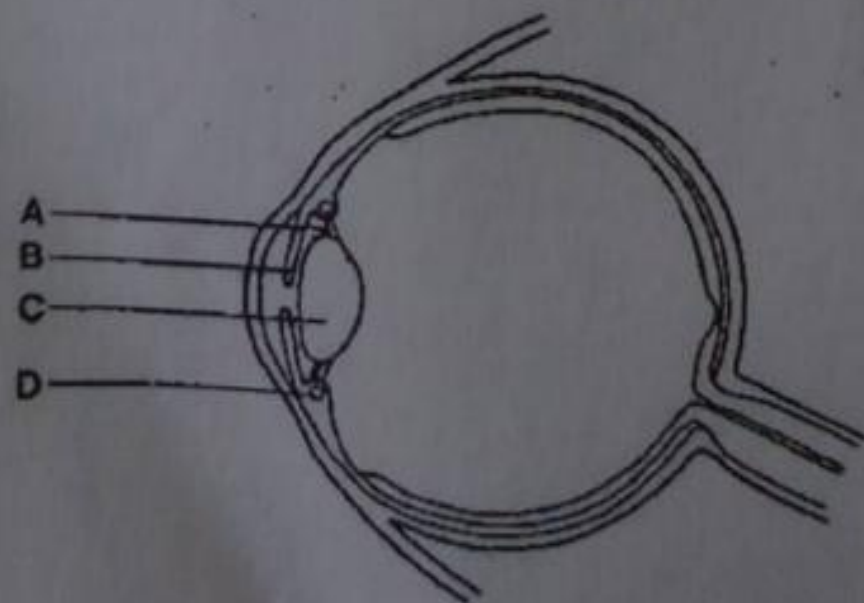
8. What is controlled by the medulla oblongata in the brain? B

- A. Balance
- B. Breathing
- C. Memory
- D. Vision

9. Which of the following results from increased secretion of adrenaline? B

- A. Increased blood supply to the intestine
- B. Increased supply of glucose in the blood
- C. Decreased breathing rate
- D. Decreased sweating

10. The diagram shows a section through the eye. Which structure contains the muscles which contract in order to produce a focused image on the retina? D



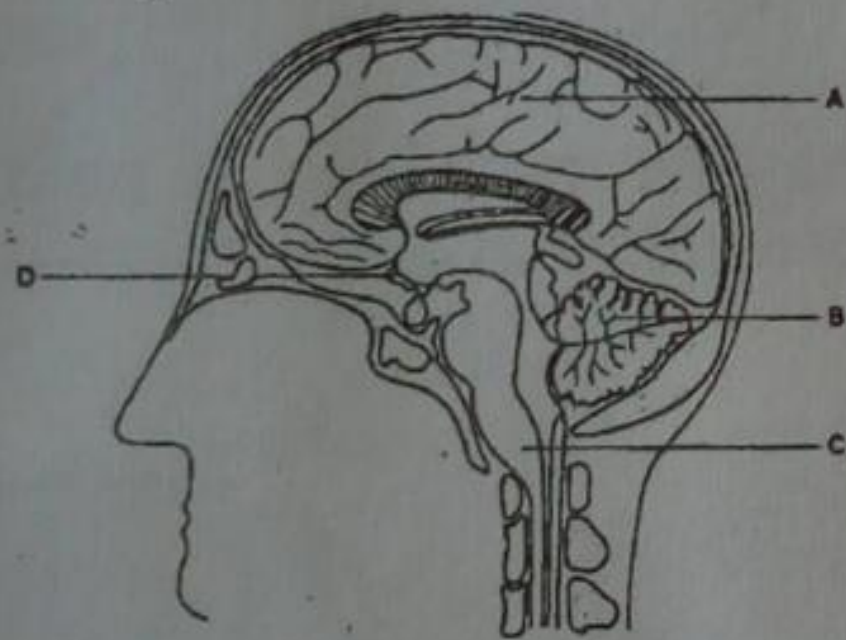
11. A child was frightened by a loud noise and shouts for the help. In which order do the different types of neuron become active in this response?

Active first		Involved last	
A. Motor neuron	relay neurone	sensory neurone	
B. Motor neurone	sensory neurone	relay neurone	
C. Sensory neurone	motor neurone	relay neurone	D
D. Sensory neurone	relay neurone	motor neuron	

12. Which changes take place in the iris of the eye when a person moves quickly from darkness into bright light?

Circular muscle of the iris	radical muscles of the iris	diameter of pupil	
A. Contract	relax	increases	
B. Contract	relax	decreased	
C. Relax	contract	decreased	B
D. Relax	contract	increased	

13. The diagram shows a section through the human skull and brain. Which part helps to regulate body temperature?



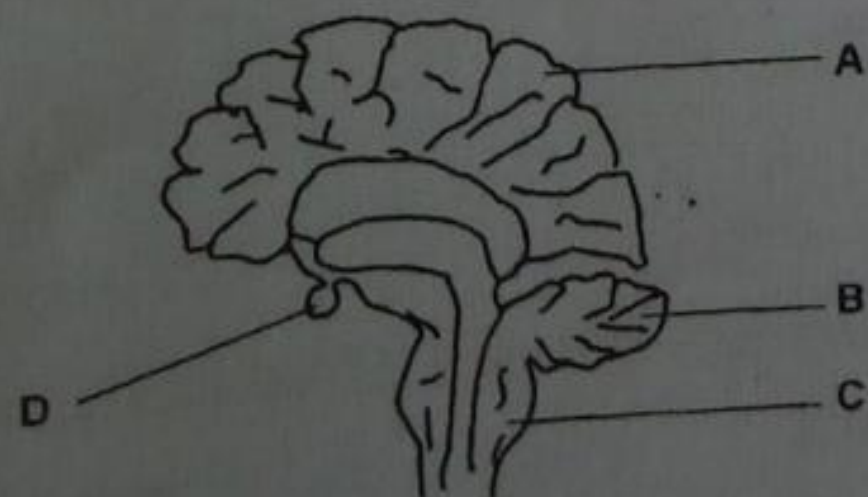
14. Which of the following normally enters the blood as it passes through the pancreas?

- A. Amino acids
- B. Glycogen
- C. Insulin
- D. Lipase

15. When a stimulus excites a neuron _____ ions rush into the cell.

- A. Sodium
- B. Potassium
- C. Calcium
- D. Hydrogen

16. The diagram shows a section through the brain.



Which part controls muscular co-ordination?

17. The _____ nervous system is made up of the spinal cord and brain.
- A. Sympathetic
 - B. Parasympathetic
 - C. Central
 - D. Peripheral
18. A (n) _____ is a single extension of a neuron that carries messages away from the cell body.
- A. Dendrite
 - B. Axon
 - C. Nucleus
 - D. Schwann
19. A _____ lies between one neuron's axon and another neuron's dendrites.
- A. Rod
 - B. Reflex
 - C. Cone
 - D. Synapse
- Chemicals called _____ diffuse across synapses and stimulate neurons.
- A. Neurotransmitters
 - B. Depolarizers
 - C. Sodium channels
 - D. White matter
20. Which of the following is NOT a type of neuron?
- A. Interneuron
 - B. Sensory neuron
 - C. Motor neuron
 - D. Stimulus neuron
21. Which of the following is NOT a taste that is sensed by taste buds?
- A. Sweet
 - B. Salty
 - C. Sweaty
 - D. Bitter
22. Which portion of the brain control balance, posture and coordination?
- A. Cerebrum
 - B. Cerebellum
 - C. Medulla oblongata
 - D. Midbrain
23. Which vision cells allows humans to see colour?
- A. Thalamic cells
 - B. Rod cells

- C. Cone cells
- D. Cortex cells

24. Which part of the ear is involved in maintaining balance?

- A. Cochlea
- B. Oval window
- C. Stapes
- D. Semicircular

C

D

25. A (n) _____ is a psychological or physiological dependence on a drug.

- A. Tolerance
- B. Addiction
- C. Reflex
- D. Withdrawal

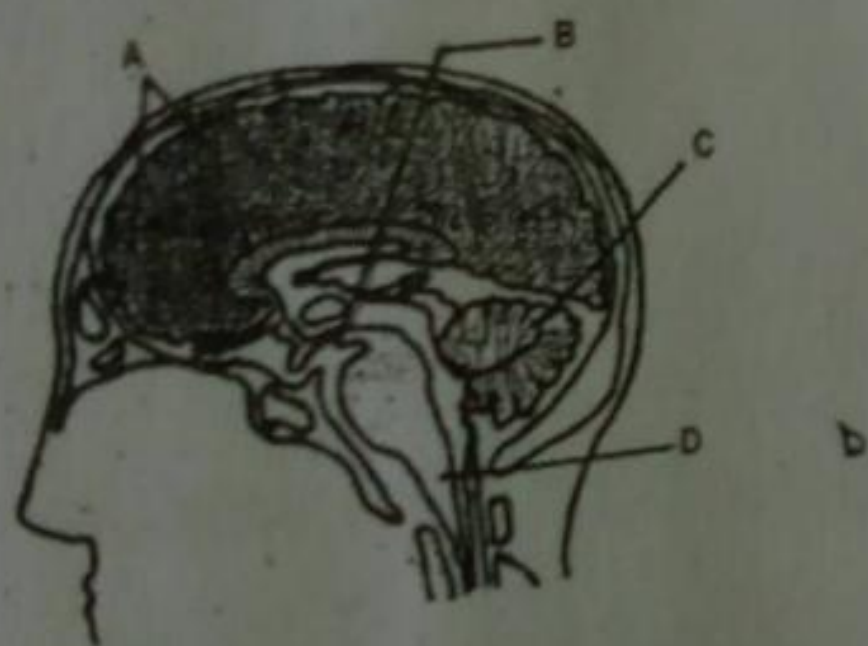
B

Of the following, which are NOT depressants?

- A. Antianxiety drugs
- B. Sedatives
- C. Caffeine
- D. Alcohol

C

26. The diagram shows a section of the human brain.



D

Choose the letter that represents the medulla oblongata

27. Which of these is NOT a type of receptor found in the dermis of the skin?

- A. Pain
- B. Light
- C. Pressure
- D. Temperature

C

28. Which of the following drugs depresses the activities of the CNS?

- A. Cocaine
- B. Aspirin
- C. Alcohol
- D. Opiate

C

29. Which type of neuron carries impulses towards the brain?

- A. Sensory
- B. Motor
- C. Association

A

D. Non of the above

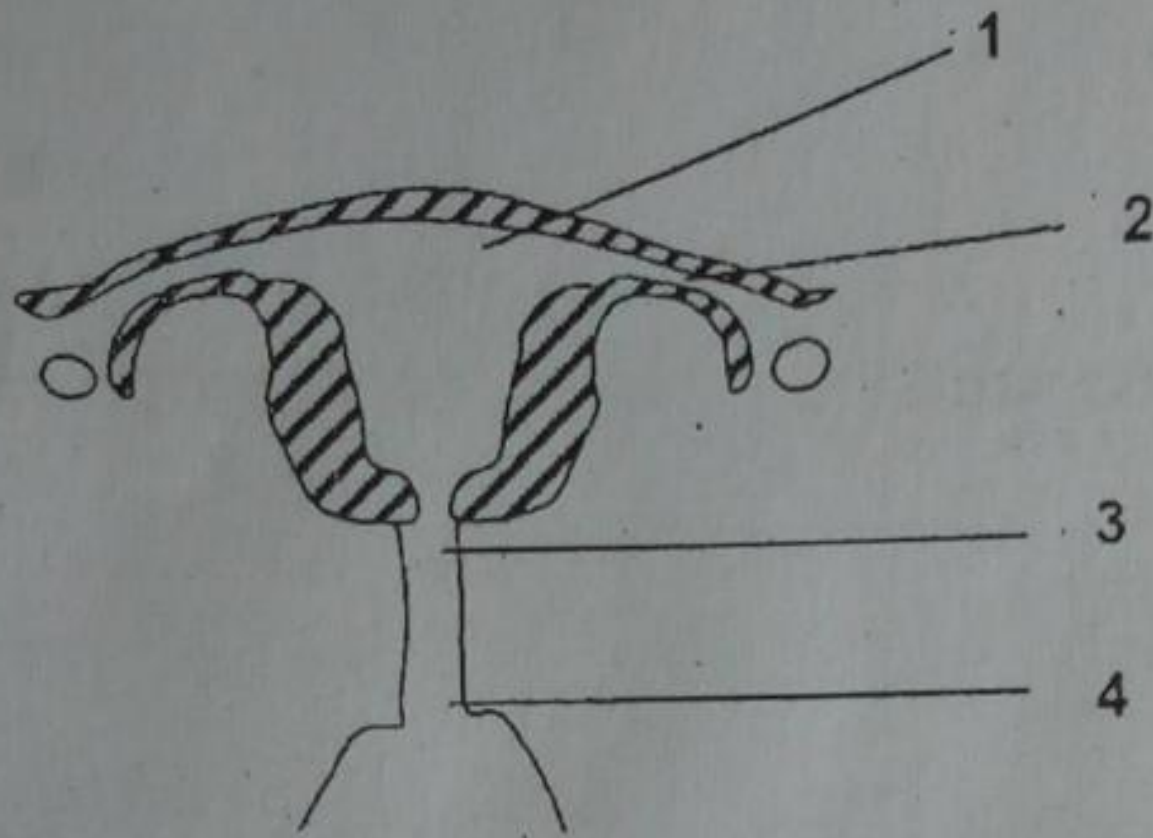
Reproduction and development

1. Which of the following is NOT a part of the male reproductive system?

- A. Scrotum
- B. Vas defers
- C. Testis
- D. Cervix

D

2. The diagram below shows the female reproductive organs.



Where does fertilization take place and where does the placenta develop?

	Fertilization	Placenta development
A.	4	1
B.	3	2
C.	2	1
D.	3	1

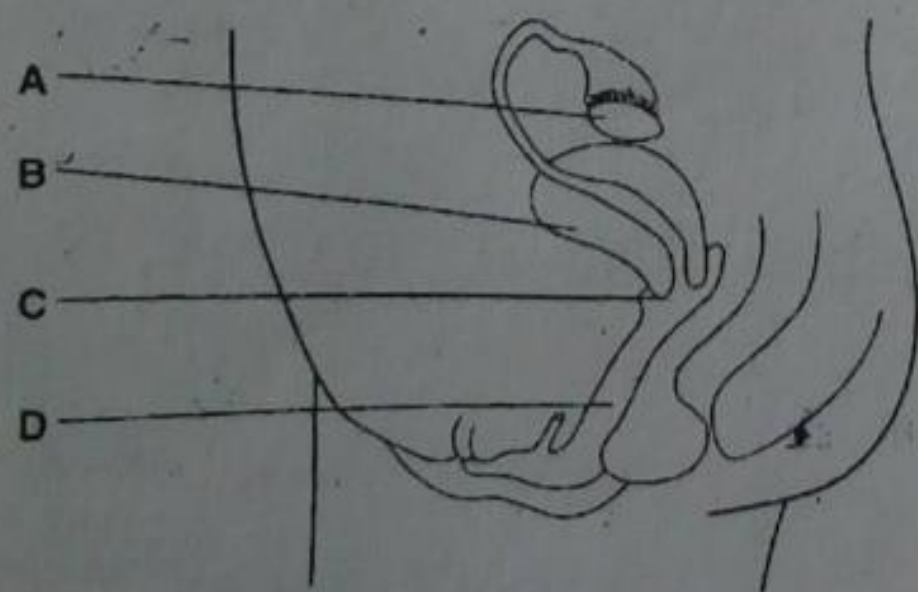
C

3. Sperms production takes place in the

- A. Urethra
- B. Bladder
- C. Testes
- D. Penis

C

4. The diagram shows a side view of the reproductive system of a woman. Which part is the cervix?



5. The _____ is a coiled tube inside the scrotum in which sperms become mature.

- A. Epididymis
- B. Vas defers
- C. Follicle

C

A

D. Prostate

6. Which of these is NOT found in a sperm?

A. Head

B. Chloroplast

C. Tail

D. Nucleus

B

7. What organ transports sperms from the testes to the urethra?

A. Epididymis

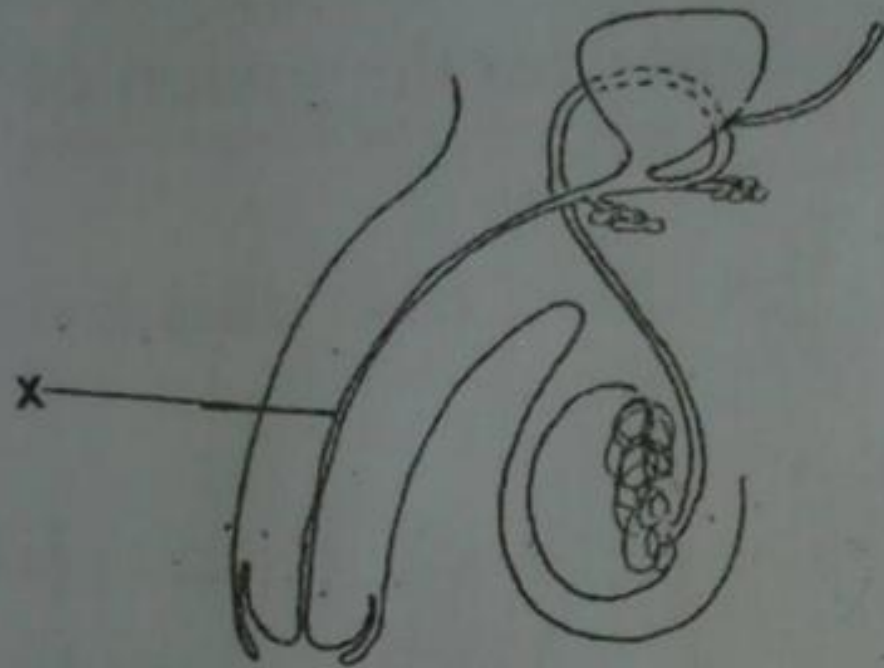
B. Vas deferens

C. Scrotum

D. Follicle

B

8. The diagram shows the reproductive system and associated structures of a human male.



What is structure X?

A. Uterus

B. Ureter

C. Sperm duct

D. Urethra

D

9. Which of these does NOT produce a fluid that surrounds sperm as they travel from the testes?

A. Seminal vesicles

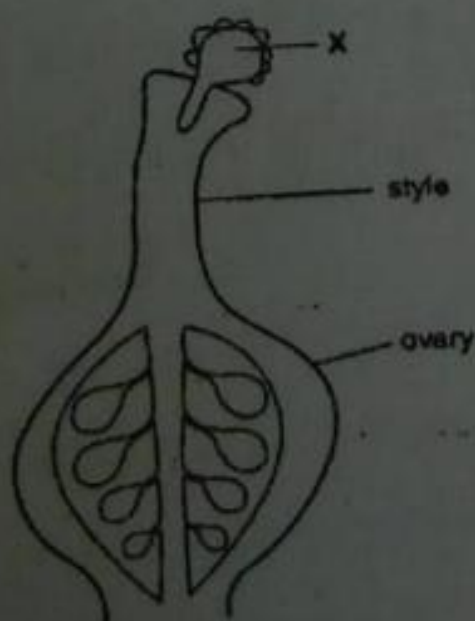
B. Bulbourethral glands

C. Prostate gland

D. Pituitary gland

D

10. The diagram shows part of a flower at one stage during reproduction. What is structure X?



A. An ovule before pollination, but after fertilization

B. An ovule before fertilization, but after pollination

C. A pollen grain before pollination, but after fertilization

D. A pollen grain before fertilization, but after pollination.

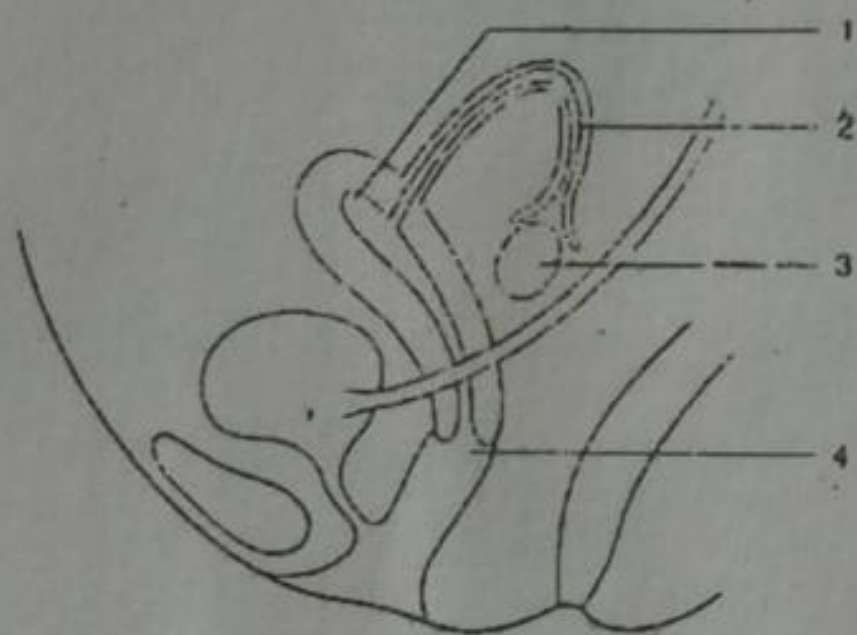
D

11. Birth control methods may be hormonal, mechanical or surgical. Which line is correct?

	Hormonal	Mechanical	Surgical
A	Condom	Spermicide	Rhythm
B	Intra-uterine device (IUD)	Rhythm	Condom
C	Pill	IUD	Vasectomy
D	Vasectomy	Pill	Spermicide

C

12. The diagram shows a side view of the female reproductive system. In which region is sperms released during intercourse and where does the fusion of sperm and egg usually take place?



	Sperm released	Fusion of egg and sperm
A	1	2
B	1	3
C	4	2
D	4	3

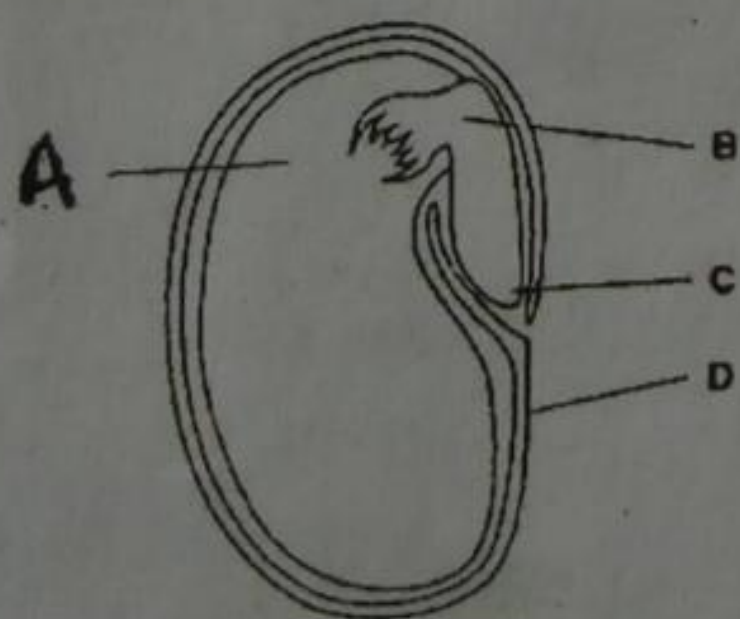
C

13. When is the sex of the baby determined?

- A. Before ovulation
- B. Between ovulation and fertilization
- C. At the moment of fertilization
- D. After the first division of zygote

D

14. The diagram shows a section of a non-endospermic dicotyledonous seed. Which structure would show the greatest loss of dry mass during the first week of germination?



A

15. Which flower structure produces pollen?

- A. Anther
- B. Carpel
- C. Petal
- D. Stigma

A

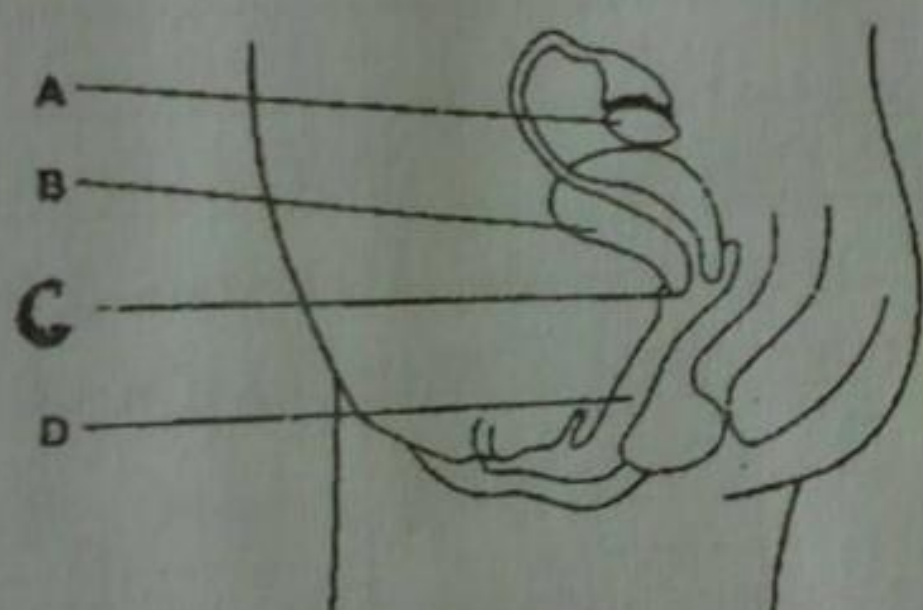
16. Which of the following can cross the placenta?

	Fatty acids	Urea	Red blood cells
A	✓	✓	X
B	X	X	✓
C	✓	X	✓
D	X	✓	X

A

17. The diagram shows a side view of the reproductive system of a woman. Which part is the cervix?

C

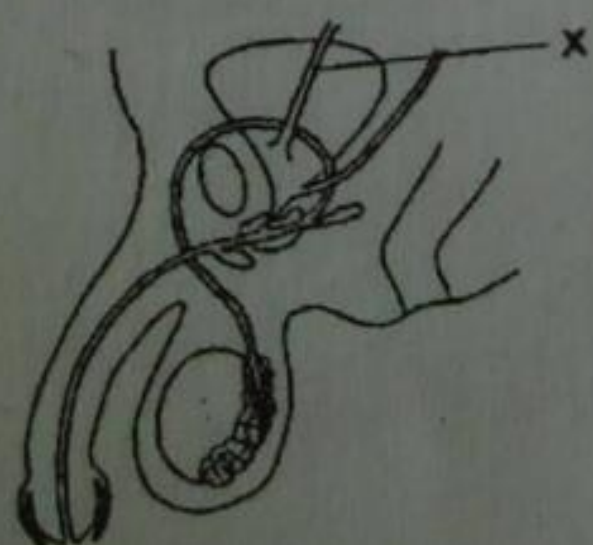


18. Sexual reproduction is a process during which

- A. All types of organism reproduce
- B. Many cells of one type fuse with a single cell of another type
- C. Nuclei of two specialized cells fuse together
- D. Parents produce genetically identical offspring

C

19. The diagram shows the male reproductive system and part of the urinary system. What is tube X?



20. Which of the following have taken place in the composition of the blood returning to the fetus (baby) from the placenta?

- Glucose**
- A. Decreased
- B. Decreased

Oxygen
decreased
increased

Urea
decreased
increased

D

- C. Increased decreased increased
- D. Increased increased decreased

21. How does the contraceptive pill prevent pregnancy?
- A. It stops the fertilized egg implantation in the uterus
 - B. It stops the sperm reaching the egg
 - C. It stops menstruation
 - D. It stops the ovary releasing eggs

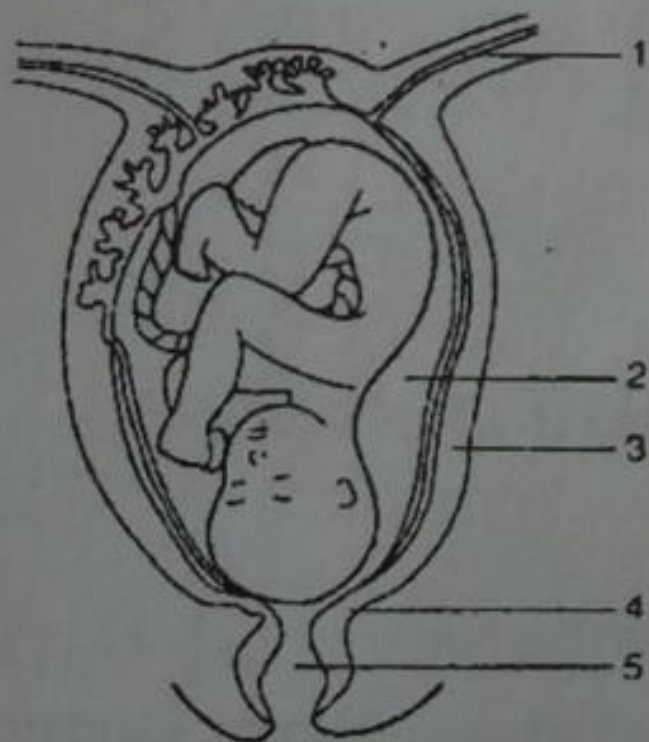
D

22. A woman's menstrual period started on 23rd march. In which week was an egg most likely to have been released?

B

Week	Sun	Mon	Tue	Wed	Thur	Fri	Sat
A	-	-	-	1	2	3	4
B	5	6	7	8	9	10	11
C	12	13	14	15	16	17	18
D	19	20	21	22	23	24	25
	26	27	28	29	30	31	

23. The diagram shows parts of the reproductive system of a woman about to give birth. Which parts are the uterus and the cervix?



- | | Uterus | Cervix |
|----|--------|--------|
| A. | 1 | 2 |
| B. | 2 | 3 |
| C. | 3 | 4 |
| D. | 4 | 5 |

C

24. What is the testa of a seed?
- A. The food storage tissue of the seed
 - B. The root of the embryo
 - C. The shoot of the embryo
 - D. The protective covering of the seed

D

25. Secondary sex characteristics began to develop during

- A. Puberty
- B. Adolescent
- C. Childhood
- D. Adulthood

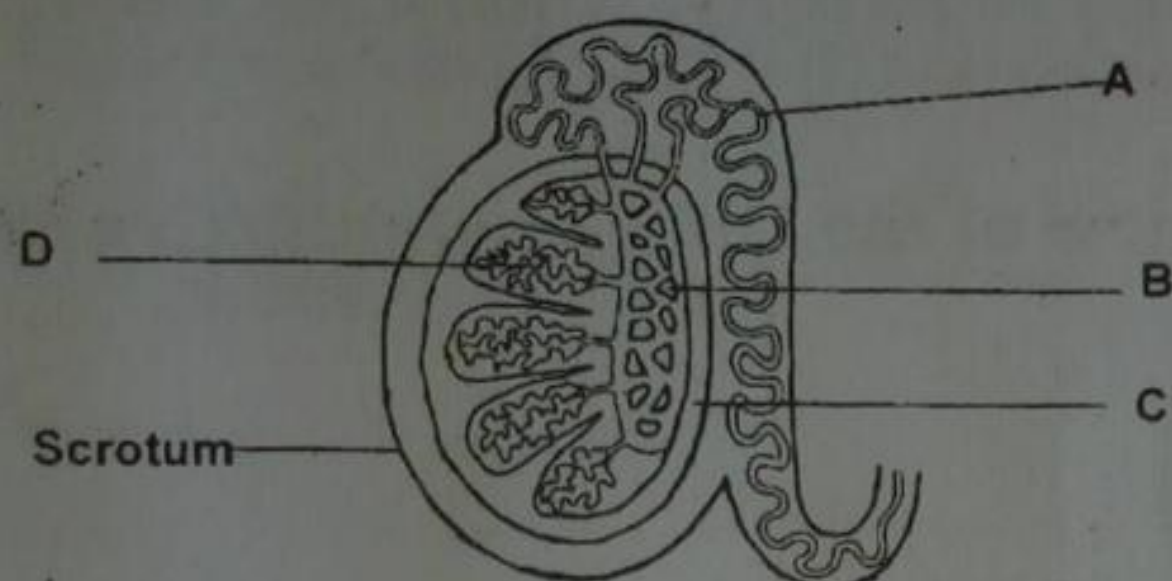
A

26. When luteinizing hormone is released by the pituitary, it causes cells in the testes to produce

- A. FSH
- B. Testosterone
- C. Progesterone
- D. Estrogen

B

27. The diagram shows a section through a testis.



D

In which area A, B, C and D are sperm cells made?

28. What tubule transports both urine and semen?

- A. Testes
- B. Vas deferens
- C. Epididymis
- D. Urethra

D

29. In females, eggs are produced in the

- A. Testes
- B. Cervix
- C. Ovary
- D. Bladder

C

30. Undeveloped egg is surrounded by a group of epithelial cells known as a(n)

- A. Oviduct
- B. Vagina
- C. Vesicle
- D. Follicle

D

31. The _____ is a tube that transports the eggs from the ovary to the uterus.

- A. Oviduct
- B. Vagina
- C. Cervix
- D. Urethra

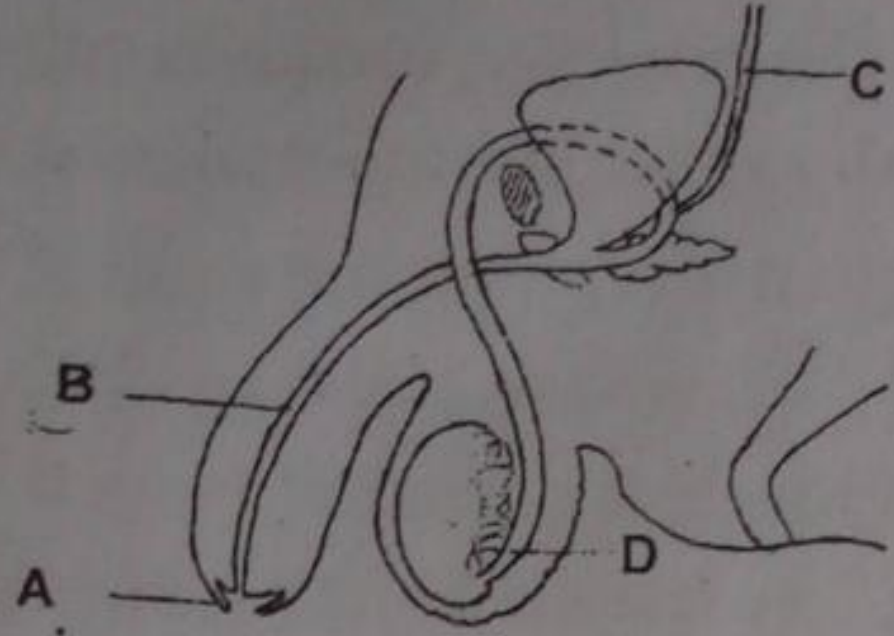
A

32. When there is a surge of LH during the menstrual cycle, what event occurs?

- A. Luteinization

- B. Fertilization
- C. Ovulation
- D. Menstruation

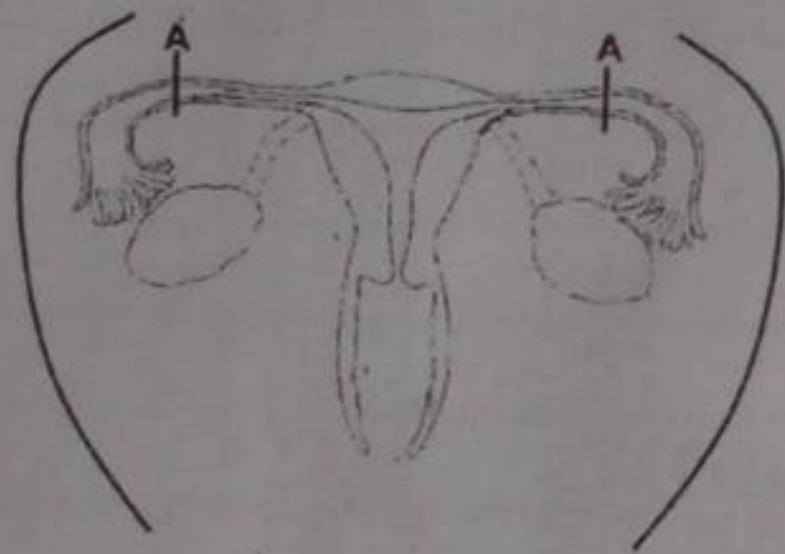
33. The diagram below shows a side view of the male reproductive system.



D

Which part is severely affected resulting in sterility, when a person has contracted gonorrhoea?

34. The diagram below shows the front view of the female reproductive system.



If the tubes were cut and tied at point A which of the following would NOT take place in the female?

- A. Menstruation
- B. Implantation
- C. Hormone release
- D. Uterine development

B

35. _____ occurs when the blastocyst attaches to the lining of the uterus.

- A. Fertilization
- B. Luteinizing
- C. Implantation
- D. Menopause

C

36. _____ occurs when an egg ruptures through the ovary wall and moves into the oviduct.

- A. Fertilization
- B. Ovulation
- C. Implantation
- D. Menstruation

B

37. Once one sperm enters an egg, no other sperm can enter because the egg's membrane

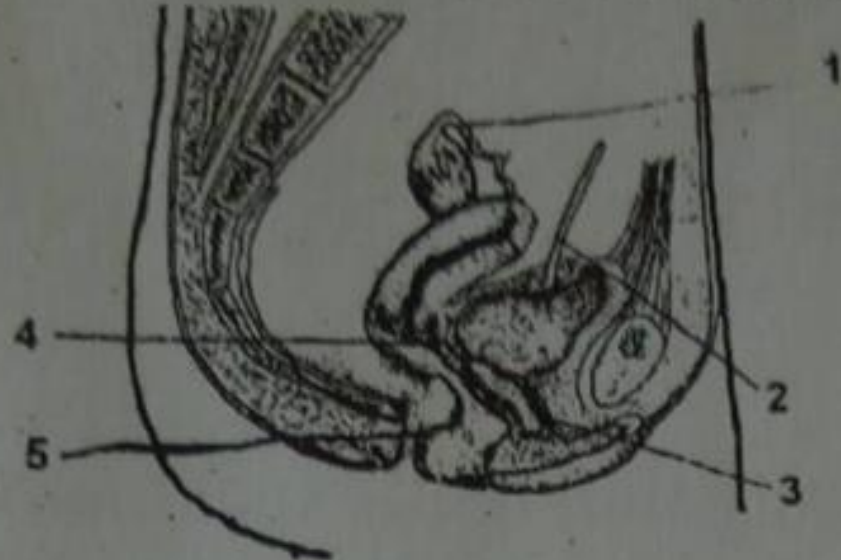
- A. Changes its shape
- B. Changes its electrical charge
- C. Hardens
- D. Closes off its pores

B

38. Human development occurs most rapidly during the _____ stage.

- A. Embryo
- B. Child
- C. Adolescence
- D. Adult

39. The diagram below shows the side view of the female reproductive system.



In which of the labeled parts 1-5 do release of sperms and fusion of sperm and ovum take place?

	Release of sperm	Fusion of sperm and ovum	
A.	3	2	
B.	4	1	
C.	5	4	B
D.	3	1	

40. During which trimester does the embryo's heart start beating?

- A. First
- B. Second
- C. Third
- D. Fourth

A

41. Which type of prenatal testing examines fetal cells for genetic disorders?

- A. Genetic counseling
- B. Ultrasound]
- C. Amniocentesis
- D. X ray

C

Disease and Immunity

1. Any disease caused by disease producing agents in the body is known as a(n) _____ disease.

- A. Infectious
- B. Endemic
- C. Epidemic
- D. Nonspecific

A

2. Bacteria, viruses and other disease-producing agents are called

- A. Parasites
- B. Pathogens
- C. Antibodies
- D. Lymph

B

3. Which of these diseases is caused by a pathogen?
 - A. Osteoarthritis
 - B. Hemophilia
 - C. Smallpox
 - D. Cystic fibrosis
4. Of the following, which is NOT a reservoir for pathogen?
 - A. Human body
 - B. Animal
 - C. Water
 - D. Lava
5. Which of these diseases is spread only through sexual intercourse?
 - A. Food poisoning
 - B. Genital herpes
 - C. Tetanus
 - D. Mumps
6. Which of these diseases is NOT caused by an arthropod vector?
 - A. Bubonic plague
 - B. Lyme disease
 - C. Influenza
 - D. Malaria
7. Viruses and bacteria damage host cells by production
 - A. Toxin
 - B. Anti bodies
 - C. Hormones
 - D. RNA
8. Diseases that are constantly present in the population are _____ disease
 - A. Infectious
 - B. Chronic
 - C. Endemic
 - D. Epidemic
9. A(n) _____ is a substance produced by a microorganism that inhibit the growth of other microorganism
 - A. Epidemic
 - B. Endemic
 - C. Antigen
 - D. Antibiotic
10. When tissue fluid collects in open-ended vessels, it is called
 - A. Lymph
 - B. Complement
 - C. Pus

- D. Blood
11. A(n) _____ is a type of white blood cell that defends the body against foreign substances.
- A. Osteoblast
 - B. Lymphocyte
 - C. Platelet
 - D. Amoocyte
12. Of these, which is NOT a type of nonspecific defence mechanism in your body?
- A. Phagocyte
 - B. Immunity
 - C. Skin
 - D. Mucus
13. _____, an enzyme produced in sweat, tears and saliva, can break down the cell walls of some bacteria.
- A. Gastric juice
 - B. Amylase
 - C. Lysozyme
 - D. Mucus
14. _____ Is a body response to an injury characterized by redness, swelling, pain and heat.
- A. Phagocytosis
 - B. Pus
 - C. Complement
 - D. Inflammation
15. Building up a resistance to a specific pathogen is called
- A. Immunity
 - B. Infection
 - C. Transmission
 - D. Complement
16. A _____ combats invading pathogens by scavenging and engulfing large numbers of microbes.
- A. Leukocyte
 - B. Macrophage
 - C. B cell
 - D. T cell
17. Which of these is produced by a body cell that has been infected with a virus?
- A. Interferon
 - B. Complement
 - C. Lysozyme
 - D. Histamine
18. A viral disease caused by pathogens carried in body fluids is

- A. AIDS
- B. Tuberculosis
- C. Diabetes
- D. Cancer

A

19. Which of the following correctly identifies the vectors of the pathogens that cause bilharzias, malaria and cholera?

	Bilharzia	Malaria	Cholera
A.	Snail	house fly	mosquito
B.	Housefly	snail	mosquito
C.	Housefly	mosquito	snail
D.	Snail	mosquito	housefly

D

20. The order in size of bacteria, viruses and protozoa, starting with the smallest is

- A. Bacteria viruses protozoa
- B. Bacteria protozoa viruses
- C. Protozoa bacteria viruses
- D. Viruses bacteria protozoa

21. Which type of lymphocyte is destroyed by HIV?

- A. Memory B cell
- B. Helper T cell
- C. Plasma cell
- D. Phagocyte

B

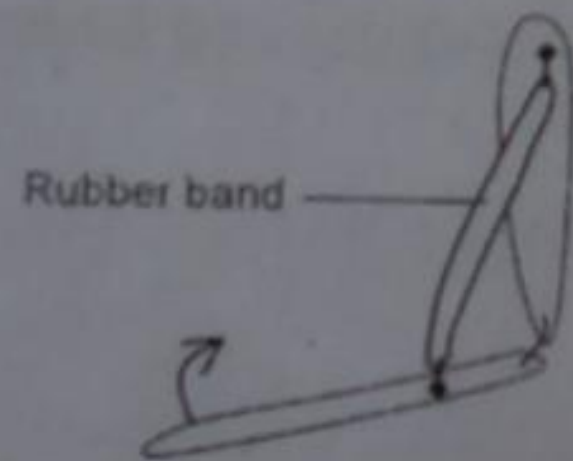
Locomotion

1. Which of these is NOT a type of tissue found in skin?

- A. Connective
- B. Epithelial
- C. Muscle
- D. Brain

D

2. The diagram shows a model used to demonstrate movement in the fore-arm.



In the human fore-arm, what would the rubber band represent and how would it cause the movement in the direction of the arrow?

B

	Rubber band	Cause of movement
A	Triceps	Contract
B	Biceps	Contract
C	Triceps	Relax
D	Biceps	Relax

3. _____ Tissue is fibrous tissue usually made of collagen and elastic protein fiber.

- A. Connective
- B. Epithelial
- C. Muscle
- D. Brian

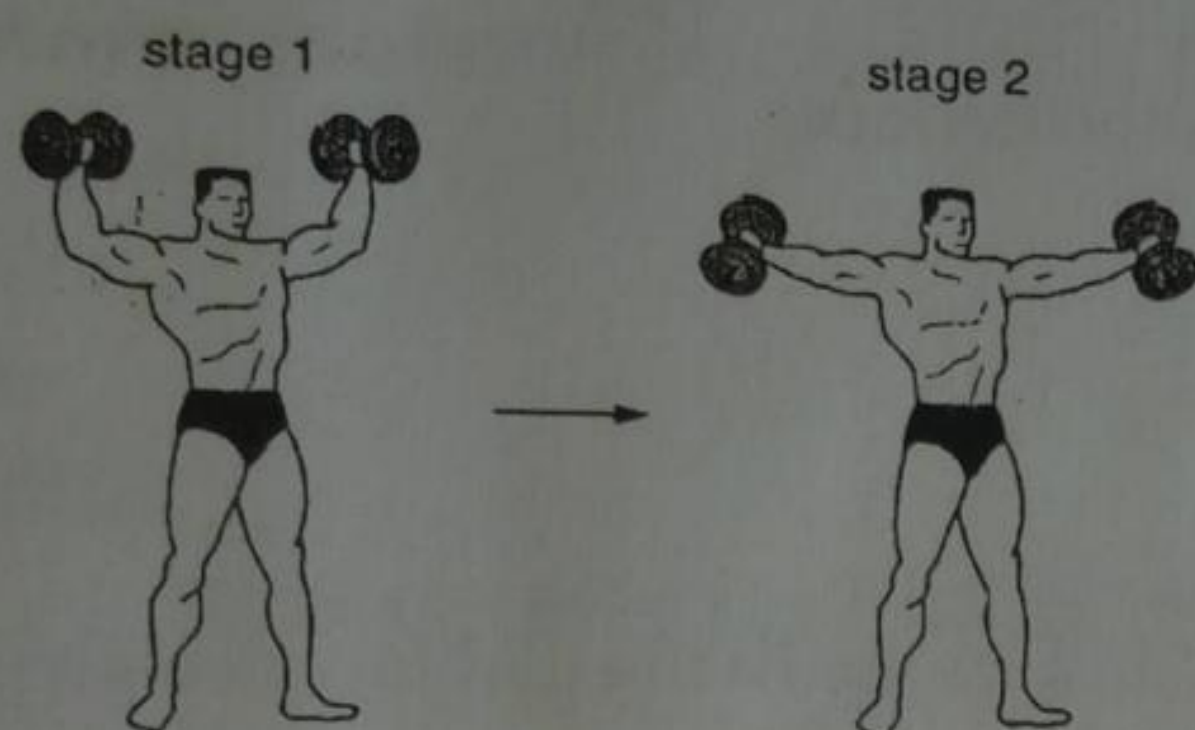
A

4. The _____ is the outer, thinner portion of the skin.

- A. Keratin
- B. Dermis
- C. Epidermis
- D. Melanin

C

5. The diagram shows two stages in weightlifting.



What are the actions of the muscles and elbow joints in moving from stage 1 to stage 2?

Biceps

- A. Contract
- B. Contract
- C. Relax
- D. Relax

Triceps

- relax
- relax
- contract
- contract

Elbow joints

- move in 1 plane
- rotate
- move in 1 plane
- rotate

C

6. _____ is a skin pigment that protects cells from solar radiation damage.

- A. Keratin
- B. Dermis
- C. Epidermis
- D. Melanin

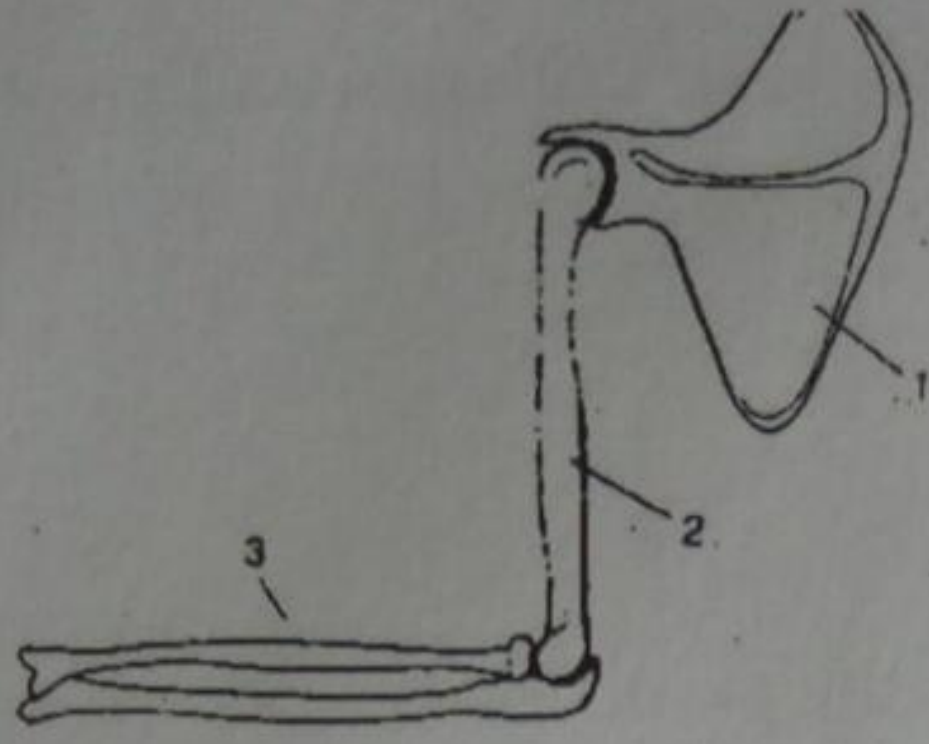
D

7. Which two bones form a hinge joint?

- A. Radius and ulna
- B. Radius and scapula
- C. Humerus and ulna
- D. Scapula and humerus

C

8. Which diagram shows the bones of a human arm? What are the numbered bones?



- | 1 | 2 | 3 |
|------------|---------|--------|
| A. Humerus | radius | ulna |
| B. Humerus | scapula | radius |
| C. Scapula | humerus | radius |
| D. Scapula | humerus | ulna |

9. Which of the following is NOT found in the dermis?
- A. Blood vessels
 B. Nerves
 C. Keratin
 D. Oil glands
10. What proteins help water proof skin and protect the living cell layers underneath?
- A. Epidermis
 B. Keratin
 C. Collagen
 D. Insulin
11. When your body heats up, it becomes wet. This is a function of the
- A. Skin cells
 B. Oil glands
 C. Sweat glands
 D. Subcutaneous layer
12. Epithelial cells are derived from the _____ of the embryo.
- A. Ectoderm
 B. Endoderm
 C. Mesoderm
 D. Metaderm
13. _____ burns are the most severe, resulting in destroying epidermis and dermis.
- A. First-degree
 B. Second-degree
 C. Third-degree
 D. Fourth-degree
14. Which of the following is NOT a function of the skeletal system?
- A. Provide a framework for body tissues
 B. Produce vitamin D
 C. Produce blood cells

C

C

B

C

A

C

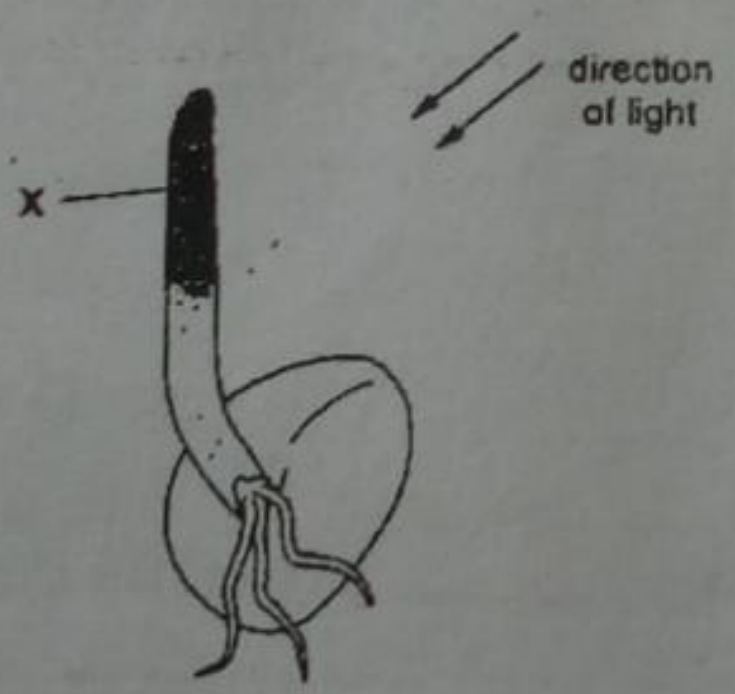
B

- D. Act as a store house
15. A _____ is where two or more movable bones meet.
- A. Joint
 - B. Suture
 - C. Bursa
 - D. Ligament
- A
16. Which of the joints allows back-and-forth movement and is found in the elbows?
- A. Gliding
 - B. Hinge
 - C. Pivot
 - D. Ball-and-socket
- B
17. The skeleton is made of
- A. Collagen
 - B. Insulin
 - C. Bone
 - D. Cartilage
- D
18. The _____ skeleton includes the skull, ribs, vertebral column and sternum.
- A. Axial
 - B. Appendicular
 - C. Bursa
 - D. Dermal
- A
19. _____ Fills the cavities of the ribs, sternum, vertebrae, skull and the long bones of the arms and legs.
- A. Compact bone
 - B. Spongy bone
 - C. Marrow
 - D. Melanin
- C
20. In movable joints, a fluid-filled sac called a _____ prevents bones from rubbing against each other.
- A. Ligament
 - B. Tendon
 - C. Bursa
 - D. Marrow
- C
21. Which of the following is NOT a type of muscle.
- A. Filamentous
 - B. Cardiac
 - C. Smooth
 - D. Skeletal
- A
22. Muscles are attached to bones by
- A. Ligaments

- B. Joints
 - C. Filaments D
 - D. Tendons
23. A muscle that contracts under conscious control is a(n) _____ muscle.
- A. Smooth
 - B. Cardiac D
 - C. Impulse
 - D. Voluntary

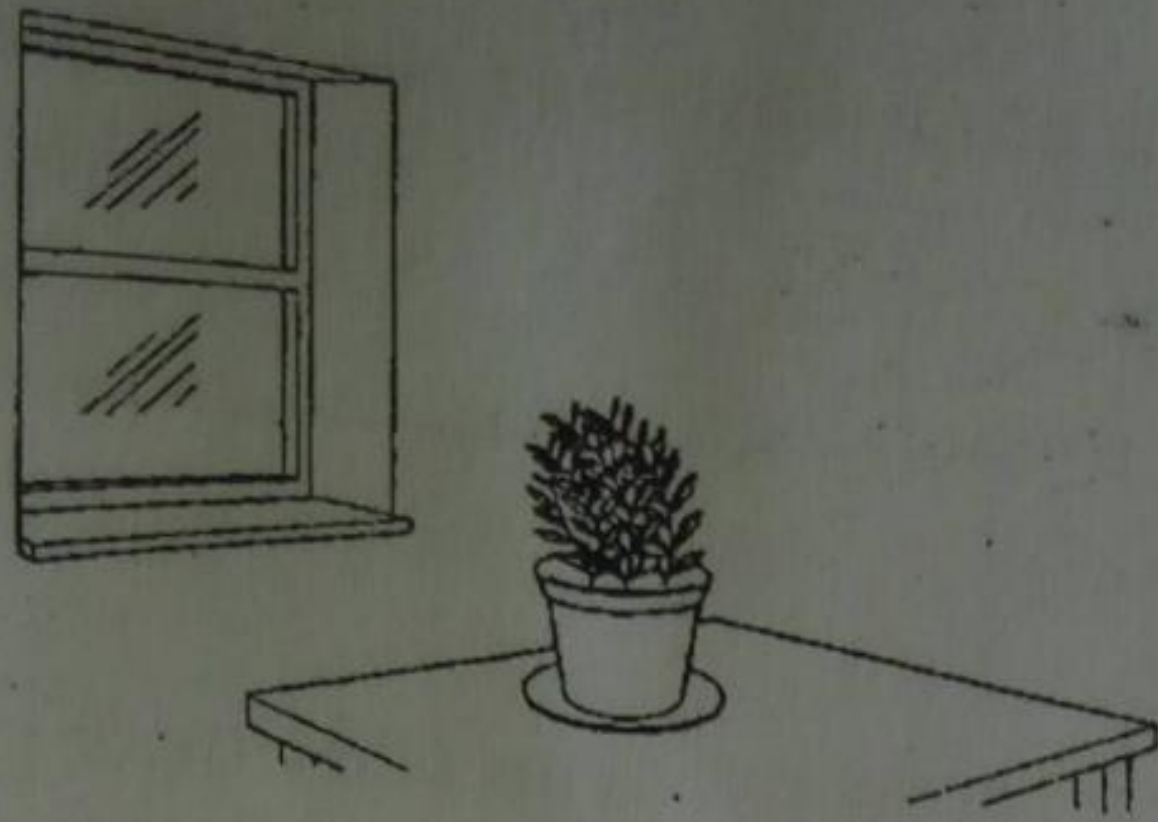
Flowering plants

1. Endosperms and gymnosperms are alike in that they both have
 - A. Spores, rhizomes, stems and leaves
 - B. Needlelike leaves, seeds and fruits C
 - C. Seeds, roots, stems and leaves
 - D. Naked seeds, embryo plants, stems and leaves
2. Angiosperms
 - A. Produce flowers and also have their seeds in fruits
 - B. Produce cones either naked seeds
 - C. Are all dicotyledons B
 - D. Are all perennials
3. The diagram shows the germinating cereal grain. What will happen at X, if light shines on the shoot tip from the direction shown?



Rate of growth	Amount of auxin	
A. Increases	high	
B. Increases	low	
C. Reduces	high	A
D. Reduces	low	

4. The diagram shows a growing plant on a table near a window.



- A. Geotropism
- B. Phototropism
- C. Geotaxis
- D. Phototaxis

B

5. In what division are flowering plants classified?

- A. Bryophyte
- B. Cycadophyte
- C. Coniferophyta
- D. Athrophyta

D

6. Which of the following correctly shows the characteristics of monocotyledons and dicotyledons?

B

	Monocotyledons	Dicotyledons
A	Leaves net veined	Leaves parallel veined
B	Fibrous root system	Tap root system
C	Vascular bundle arranged in rings	Vascular bundles scattered
D	Seed has no endosperm	Seed has endosperm

7. What are the two classes of anthophytes?

- A. Monocotyledons and dicotyledons
- B. Annuals and perennial
- C. Annuals and biennials
- D. Angiosperms and gymnosperms

A

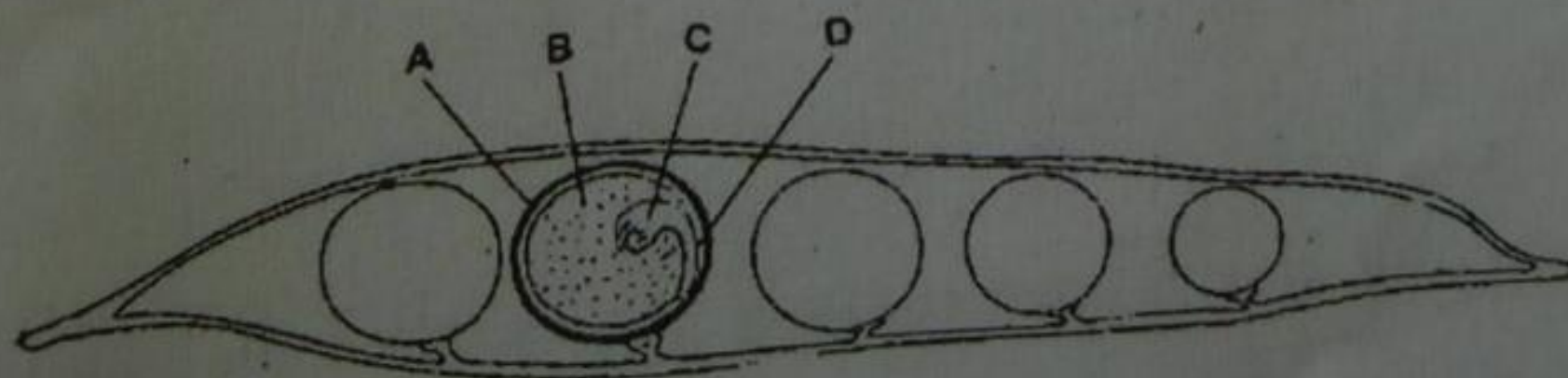
8. Grasses, orchids, lilies and palms all have one seed leaf and are called

- A. Dicotyledons
- B. Monocotyledons
- C. Annuals
- D. Biennials

B

9. The diagram shows a section through a fruit and one of the seeds it contains. What structure is a cotyledon?

B



10. _____ have two seed leaves and include many flowering trees, wildflowers and garden flowers.

- A. Monocotyledons
- B. Annuals
- C. Perennials
- D. Dicotyledons

D

11. Which plants have leaves with a branching network of veins and flower parts in multiples of four or five?

- A. Monocotyledons
- B. Annuals
- C. Perennials
- D. Dicotyledons

D

12. Plants with parallel veins and flowers parts in multiples of three are

- A. Monocotyledons
- B. Annuals
- C. Perennials
- D. Dicotyledons

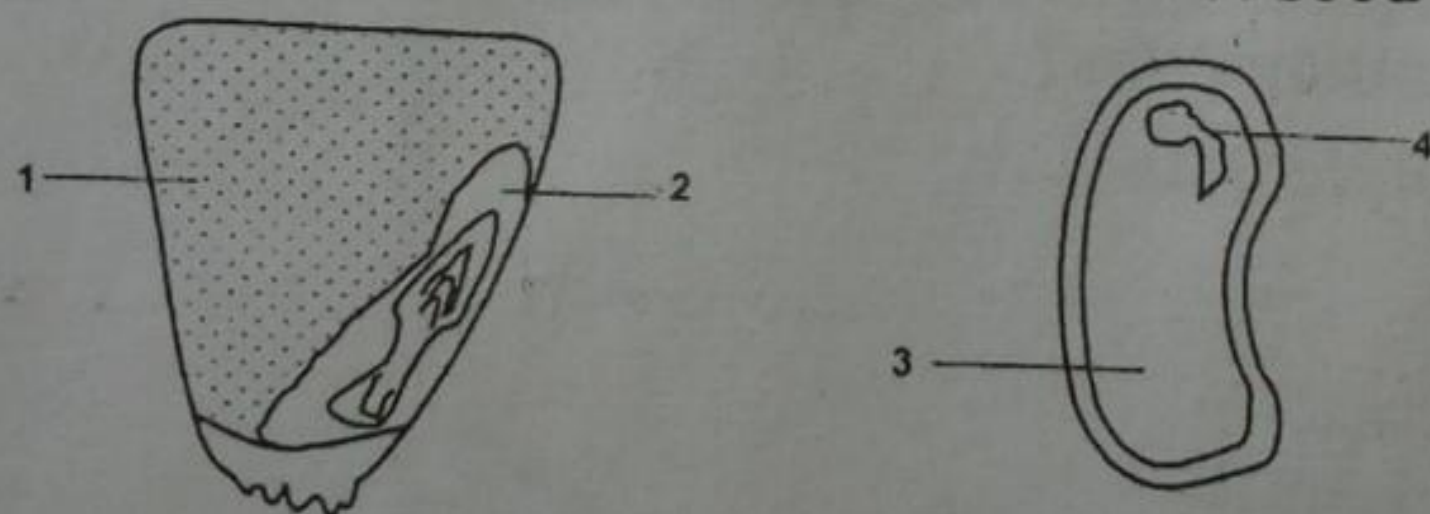
A

13. One advantage to plants of having fruit-enclosed seed is that

- A. People will eat them
- B. They can store food for the winter
- C. They have added protection for them newly developing plant
- D. They will have a longer life span

C

14. The diagram below show sections of a monocot seed and a dicot seed.



Which numbered parts are referred to as seed leaves?

- A. 2 and 4
- B. 1 and 4
- C. 2 and 3
- D. 2 and 4

A

15. Plants that complete their life cycles in a year or less are called

- A. Biennials
- B. Annuals
- C. Perennials
- D. Monocots

B

A cross section of a root show a star-shaped mass of xylem when the plant is a(n)

- A. Dicot

B. Monocot

C. Annual

D. Perennial

A

16. If you observe a cross section of a root under the microscope and see that strands of xylem alternate with strands of phloem and that there is a central core of pith, the plant is a(n)

A. Dicot

B. Monocot

C. Annual

D. Perennial

B

17. Water and mineral ions enter the root by absorption into the

A. Phloem

B. Cuticle

C. Stomata

D. Root hairs

D

18. Cambium and apical meristem are examples of

A. Photosynthesis tissue

B. Protective tissue

C. Growth tissue

D. Transport tissue

C

C

19. One of the primary structural difference between roots and stems is the

A. Arrangement of vascular tissue within the stem and root

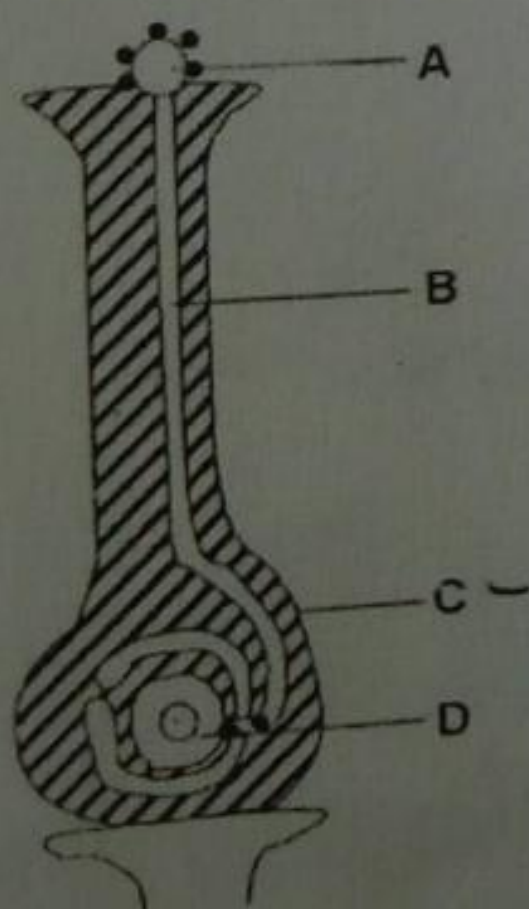
B. Arrangement of pith within the stem and root

C. Differences in the functions of xylem and phloem

D. Differences in the numbers of stomata

A

20. The diagram below shows the female part of a flower. Which structure will develop into the fruit after successful fertilization?



What is the primary function of leaves?

A. To provide protection for the plant

B. To provide water for the plant

C. To trap light energy for photosynthesis

D. To enable the plant to grow taller

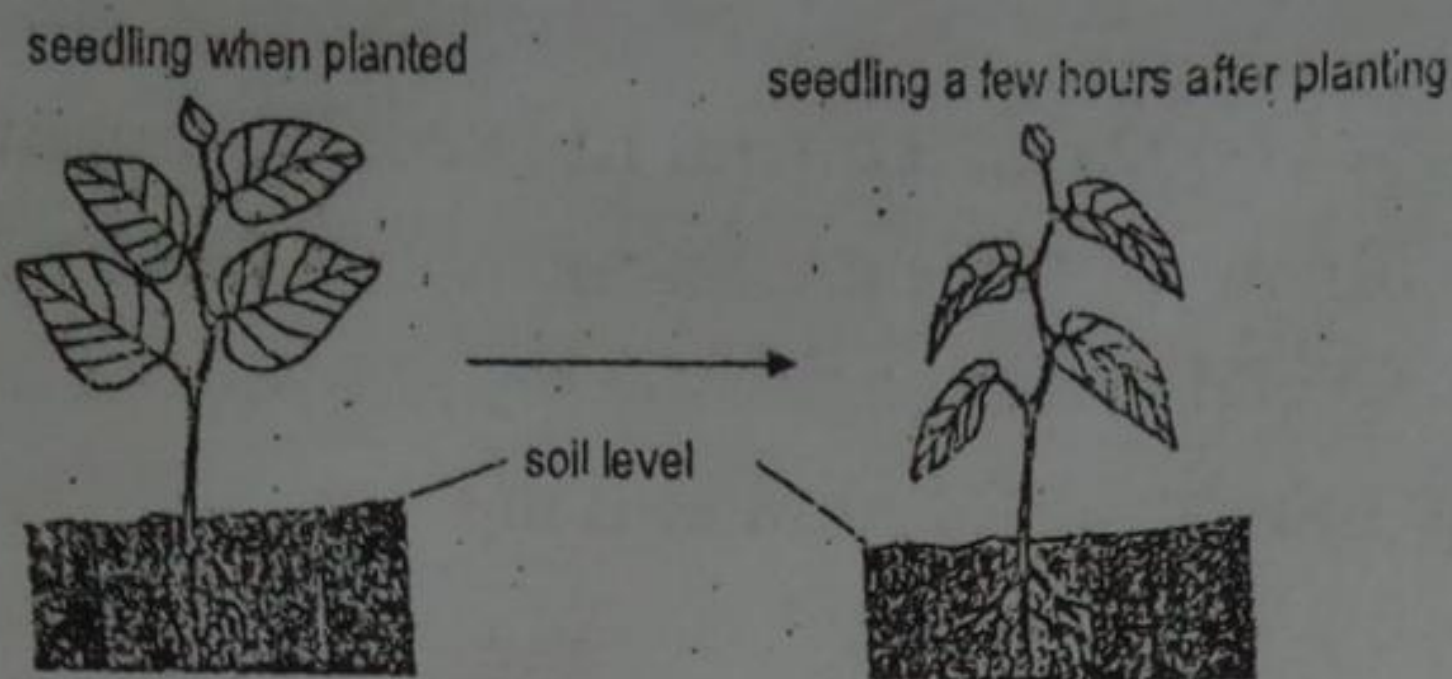
C

21. _____ Cells regulate the size of the opening of the stomata.

- A. Cuticle
- B. Guard
- C. Epidermal
- D. Mesophyll

B

22. The diagram below shows how a seedling changes appearance a few hours after planting.



Identify the environmental conditions which will contribute to the changes above.

Light intensity	Humidity	Temperature
A. Low	low	low
B. Low	high	high
C. High	low	high
D. High	high	low

C

PART 2 (paper 2)

SECTION I – ORGANISATION AND MAINTENANCE OF THE INDIVIDUAL

Specialized cells, tissues and organs and 3. Diffusion and osmosis

1. (a) Explain why osmosis may be considered to be a special type of diffusion.

Ans.

Water molecules pass through a selective permeable membrane when they diffuse in the process of osmosis. That is why osmosis is a special type of diffusion.

(b) Describe and explain the effects of placing into pure water.

(i) A plant cell

Ans.

A plant cell: its cytoplasm and vacuole swell but the cell does not burst.

(ii) A animal cell

Ans.

An animal cell: it bursts in pure water.

(c) When the rate of water loss from a plant is greater than the rate of water uptake, the stomata close. Explain

(i) How stomata close

Ans.

When a plant is short of water, the guard cells become flaccid. As a result, stomata close.

- (ii) How this closing is an advantage to the plant under these conditions.

Ans.

The plant cell can cut down the rate of transpiration to reduce the loss of water

4. Enzymes

1. A student carried out an experiment on the fat content of two different milk samples, A and B. Fig. 3A shows a sequence of steps in the experiment. The Ph indicator used is colourless when the pH is 7 or less and purple when the pH is over 7.

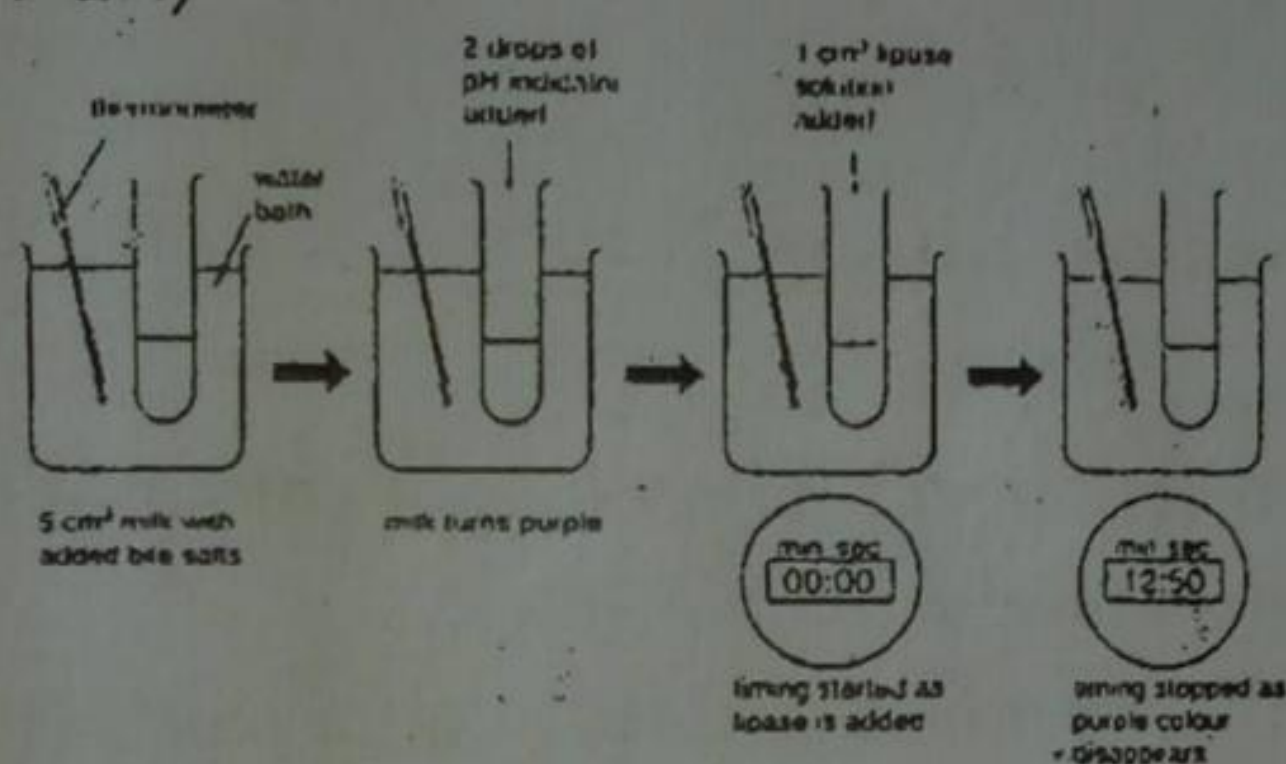


Fig. 3A

The experiment was carried out at different temperatures. The time taken for pH indicator to lose its colour are shown in Fig. 3B.

The experiment was carried out at different temperatures. The times taken for the pH indicator to lose its colour are shown in Fig. 3B

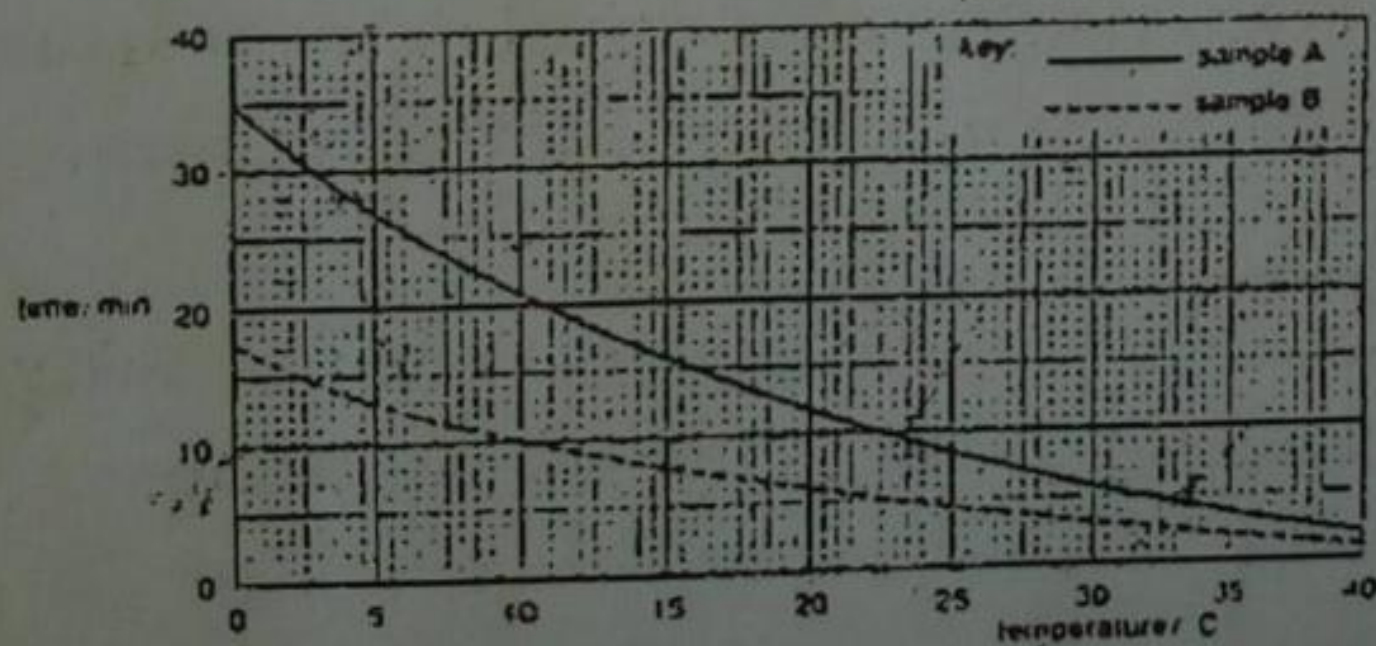


Fig. 3B

Temperature / °C	Time taken for indicator to lose its colour / min
8	17
22	7
31	4

- (a) State one condition, other than temperature or fat content, which might affect the rate of the chemical reaction controlled by the lipase.

Ans.

The pH in the milk or the amount of lipase solution.

- (b) State two reasons why bile salts were added to milk at the start of the experiment.

Ans.

1. To make the pH of milk over 7.
 2. To emulsify the fat content
- (c) Explain how the action of the lipase led to the indicator losing its colour.

Ans.

The lipase breaks the fat contents into glycerol and fatty acids, which make the milk acid. Table 1 shows the time taken for the indicator to lose its colour when goat's milk was used.

- (d) (i) Using the information in fig.3B and table 1, place the three milk samples in order of their fat content, starting with the lowest.

Ans.

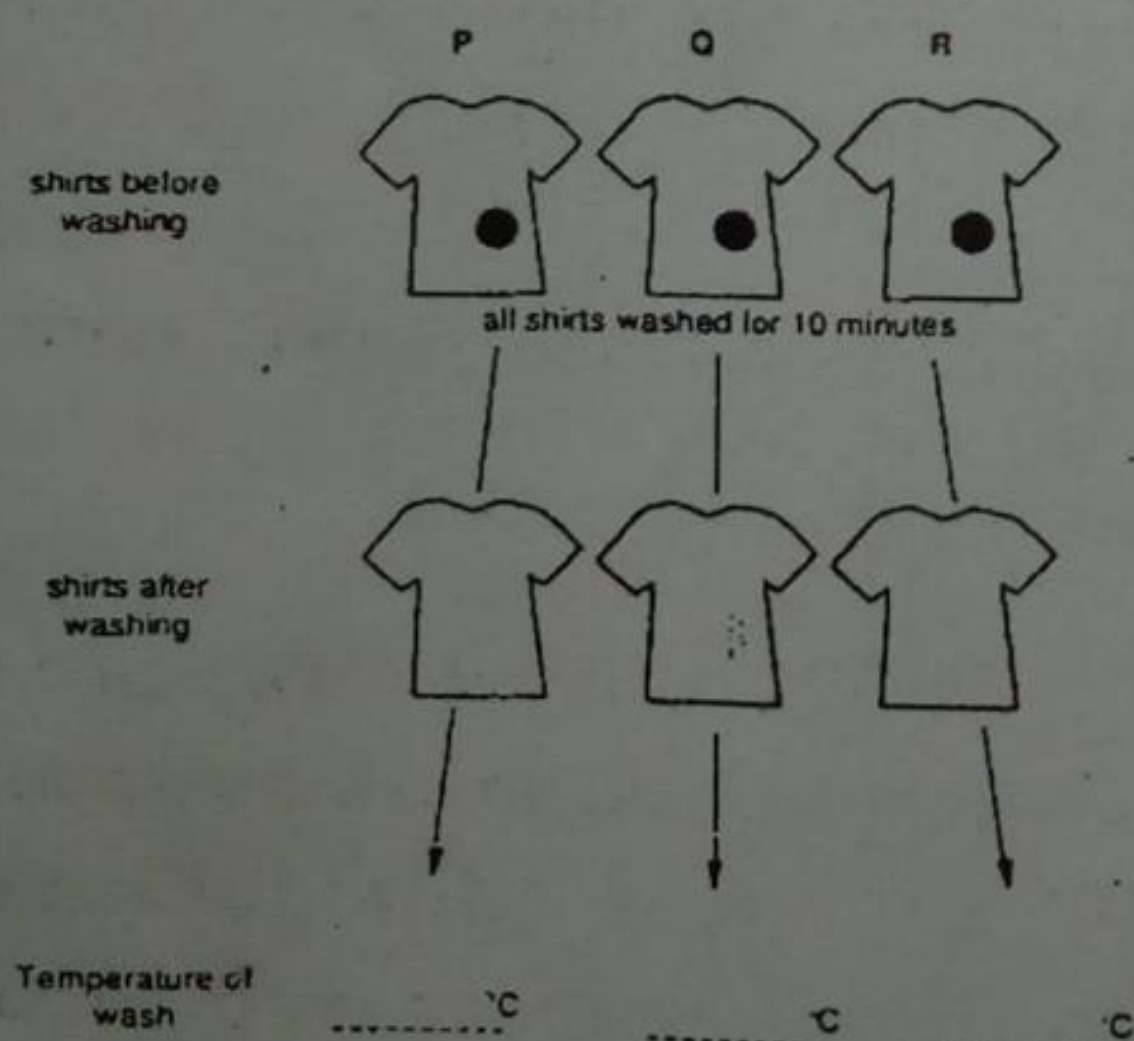
1. Sample A
2. Goat's milk
3. Sample B

(ii) Explain your answer.

Ans.

More fat content causes faster reaction and earlier loss of colour of the indicator. The sample B lost its colour earliest and the sample A latest.

2. Fig.4 shows details of an experiment in which three similar shirts (P, Q and R), with identical fat stains, were washed in an enzyme-containing washing powder at three different temperatures, 15°C, 35°C and 65°C.



- (a) (i) Complete fig. 4 to show the temperature at which each shirt was washed.

Ans.

P:15 Q:65 R:35

(ii) Explain your answer for each shirt.

Ans.

P: Under the condition, molecules in the fat stain and enzyme are less liable to react together.

Q: Under the condition, enzyme is denatured. So the enzyme denatured loses its original property which works on the fat stain.

R: This temperature is optimum among three conditions. So enzyme can work on the fat stain actively.

- (b) Suggest two changes to the producer which might have resulted in the complete removal of stains from shirt R.

Ans.

1. The pH condition must be kept neutral.
2. Time to wash must be lengthen.

- (c) (i) Name the enzyme likely to be in the powder.

Ans.

(i) Lipase

- (ii) Suggest what type of enzyme would need to be present in a washing powder designed to remove blood stains?

Ans.

(i) Protease

1. Nutrients

1. (a) (i) What do the chemical structures of carbohydrates and fats have in common?

Ans.

Both of them consist of carbon, hydrogen and oxygen atoms.

- (ii) How do their chemical structures differ?

Ans.

Carbohydrates are the polymers of monosaccharides, while fats are the compounds of fatty acids and glycerol.

(b) Explain

- (i) How protein stored in a named seed is used by the embryo plant during Germination

Ans.

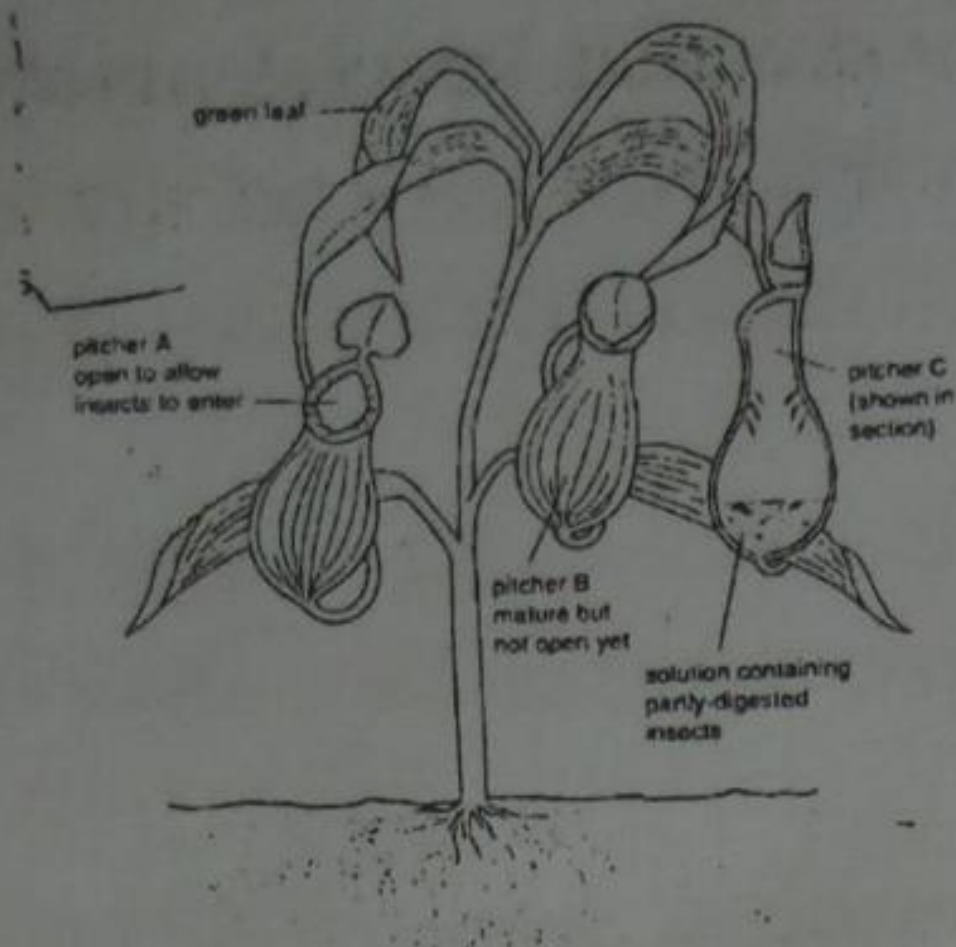
Two types of proteins are stored in a cotyledon bean seeds. One in enzymes like amylase which breaks starch into glucose to be used up in the respiration of the embryo. The other is once broken down into amino acids and assembled into new protein molecules which are essential to make new cell membranes and cytoplasm of the embryo.

- (ii) How molecules of urea are produced from food protein.

Ans.

The food protein taken into the body is digested into amino acids, and they are absorbed through the villi into the blood. Then they are carried through the hepatic portal vein to the liver. Then excess amino acids are deaminated into carbohydrates and ammonia, and those ammonia are converted into urea.

2. Figure 4.1 shows a pitcher plant, which has normal green leaves as well as leaves modified to form pitchers. A pitcher plant makes carbohydrates in the usual way.



(a) Complete the table to show the raw materials used by the pitcher plant to make its carbohydrates and from where these raw materials are absorbed.

Raw materials	From where absorbed

Pitcher plants are able to digest insects in solutions which they secrete into their Pitchers. A student wanted to investigate the nature of these solutions.

Table 4.1 below, summarises the contents of the six-test-tubes which were set up.

Table 4.1

Test tube P	Test tube Q
2cm ³ water 1cm ³ raw meat	2cm ³ liquid from pitcher B 1cm ³ raw meat

Test tube P	Test tube S	Test tube T	Test tube U
2cm ³ boiled and cooled liquid from pitcher B 1cm ³ raw meat	2cm ³ water 1cm ³ butter	2cm ³ liquid from pitcher B 1cm ³ butter	2cm ³ boiled and cooled liquid from pitcher B 1cm ³ butter

Five hours later, the only visible change was that the cube of meat in test-tube Q was much smaller.

(b) State the purpose of test-tubes P and S, and test-tubes R and U.

Ans.

P and S are control experiments to check that meat and butter do not change without liquid from pitcher B. R and U are control experiments to check that liquid from pitcher B loses function when it is boiled.

(c) At the end of the experiment, which chemical would be present in test-tube Q, but not in any other test-tubes? Explain your answer.

Ans.

Chemical: amino acids

Explanation:

From pitcher C, we can guess that the function of liquid in pitcher is digestion of food. And from results of the experiments this liquid loses function by boiling and cannot digest fats (in butter) in tube T, but it can digest proteins (in raw meat) in tube Q. so proteins are broken into amino acids.

(d) Using only the information provided in the question, suggest which mineral ion may be deficient in the soils in which pitcher plants grow. Explain your answer.

Ans.

Mineral: nitrates

Explanation:

From above experiments, this plant takes amino acids from insects. It means this plant cannot make enough amino acids. Particular raw material that is contained in amino acids is nitrates. So we can guess nitrates are deficient in the soil.

3. Fig 1 shows the proportions of the main chemical substances found in the human body.

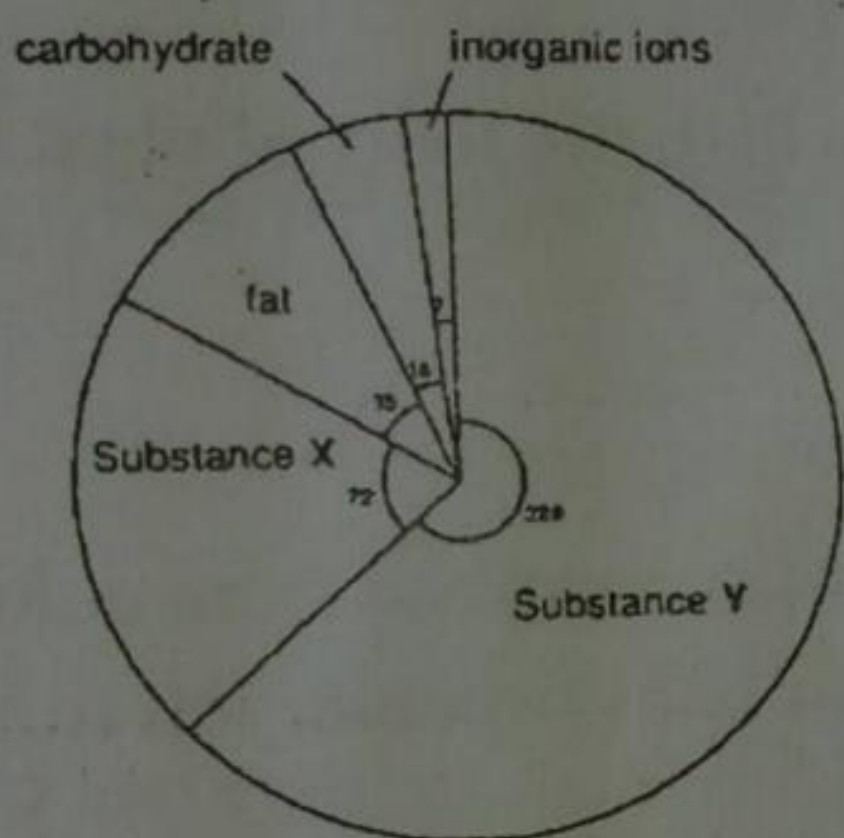


Fig. 1

(a) What is the percentage of carbohydrates? Show your working.

Ans.

$$18 \div 360 \times 100 = 5\%$$

(b) What are substances X and Y most likely to be?

Ans.

X:protein Y:water

(c) Name two inorganic ions and for each one, state its function in the body.

Ans.

1. Iron

Function: it is a component of hemoglobin molecule.

2. Calcium

Function: it helps in the formation of strong teeth and bones.

(d) Removal of person's gall bladder could affect the digestion of one of the substances shown in fig. 1. Name the substance and explain how its digestion might be affected.

Ans.

Substance: fat

Explanation: since the gall bladder will cause a lack of the bile which contains bile salts. So bile salts can normally reduce liquids (fats) into small droplets, increasing the surface area for digestion, but without bile salts, lipids (fats) remain big molecules which will delay the digestion.

5.2 Plant nutrition

1. Fig.3.1 shows an experiment to investigate the uptake of ions by a plant. The culture solutions contained measured quantities of all the ions necessary for plant growth, dissolved in water which had been boiled to remove dissolved gases.

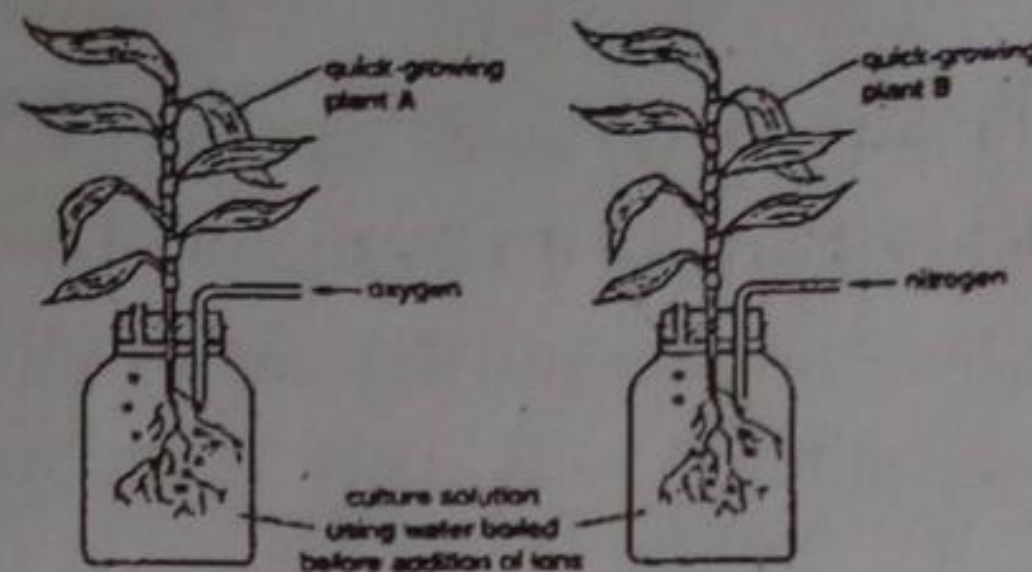


Fig. 3.1

(a) Name the process, characteristic of all plant cells, which the roots of plant B will be unable to carry out.

Ans.

Respiration

Using the radioactive form of ion, the rate at which I is absorbed from culture solutions can be measured. Fig.3.2 shows the rate of uptake of one particular ion from the two solutions in fig. 3.1.

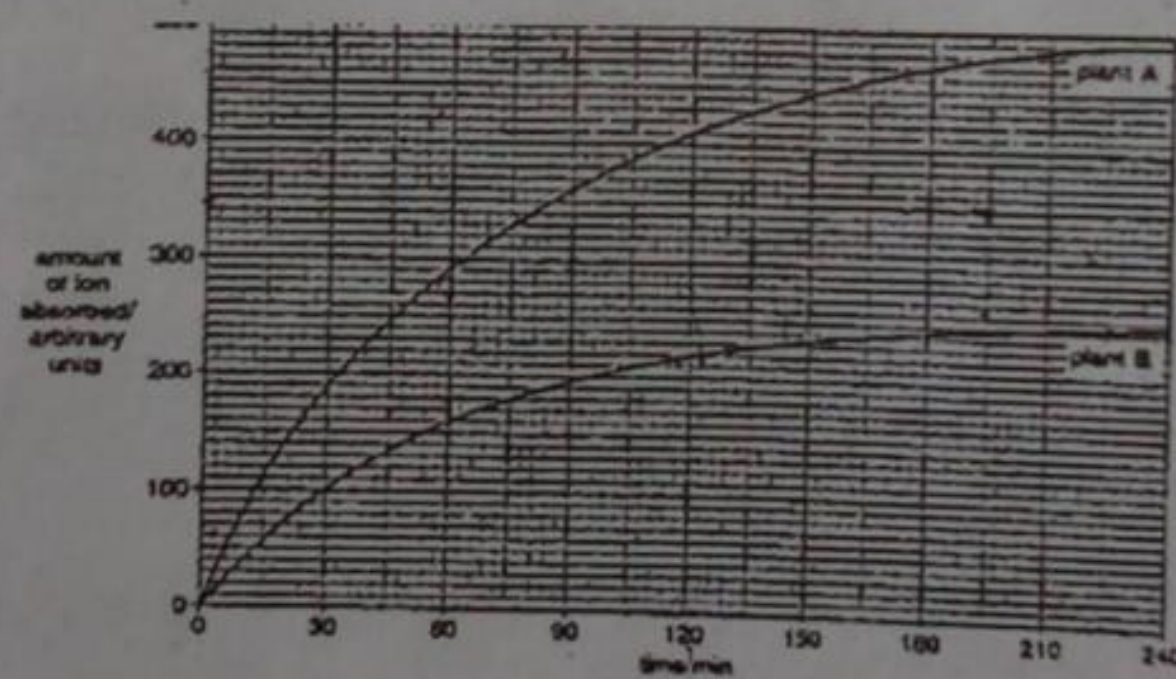


Fig. 3.2

(b) Using fig.3.2

(i) State how long it took plant A to absorb 330 units of the ion;

Ans.

90 minutes

(ii) Calculate the difference in uptake of the ion between the two plants after three hours.

Ans.

$470 - 245 = 225$ units

c) Explain the difference in the ion uptake between the two plants.

Ans.

Plant A absorbs the ion more rapidly than plant B.

(c) Describe and explain the appearance of plant A if the culture solution had been deficient in

Ans.

(i) The leaves of plant A would become yellow

Ans.

(ii) The leaves of plant A would be stunted and poorly developed.

2. A student carried out an experiment to investigate the growth of floating water plants taken from a pond. Equal masses of the plant were placed into three separate glass containers A, B and C, similar to the one shown in fig. 3.1. container A was lit by a 250W bulb, B was lit by 75W bulb and C was lit by a 250W bulb with a coloured filter in front of the lamp, as shown in Fig.3.1

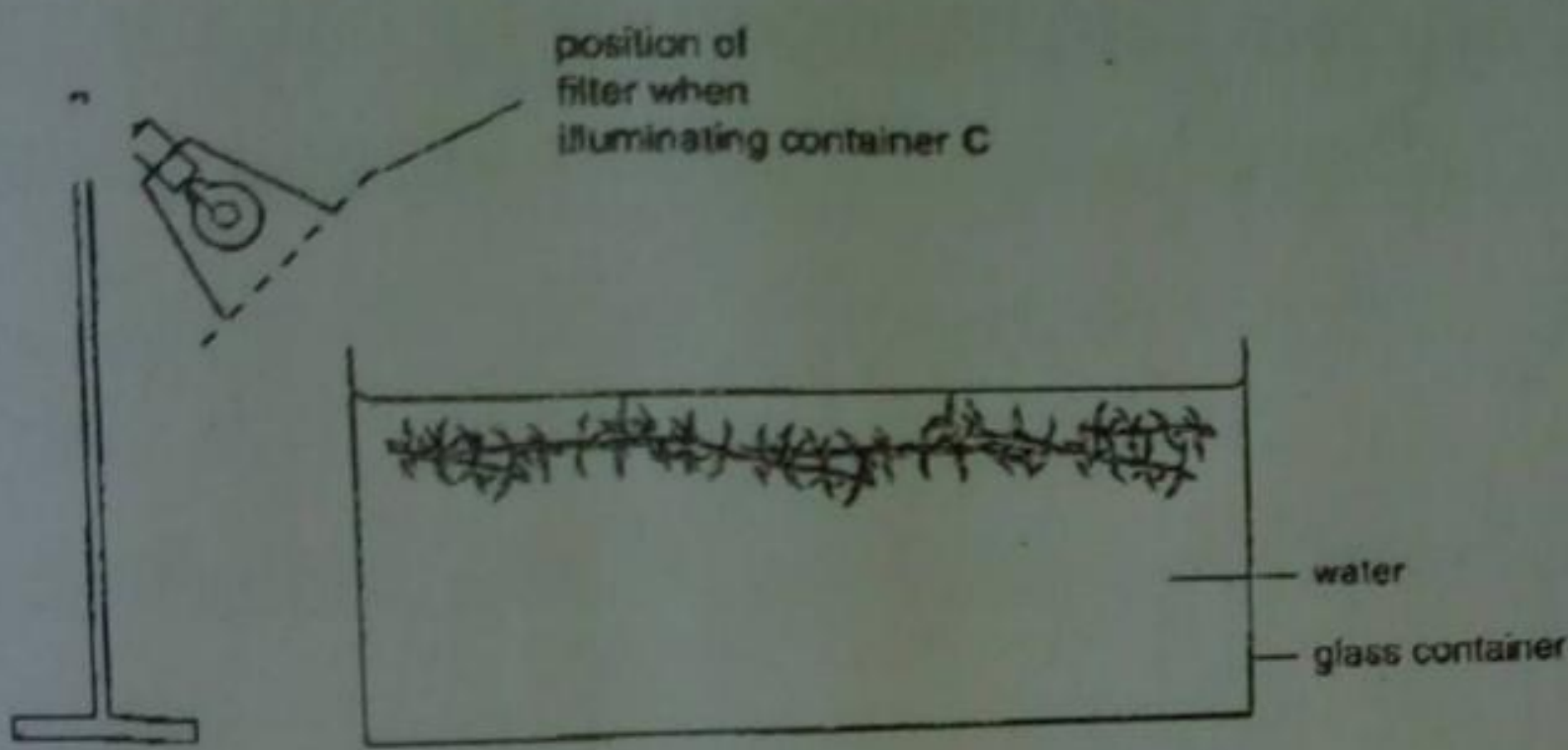


Fig. 3.1

At weekly intervals, the plants were removed from each container in turn, gently dried, weighed and returned to their mass had been recorded. Fig3.2 shows the results plotted on a graph.

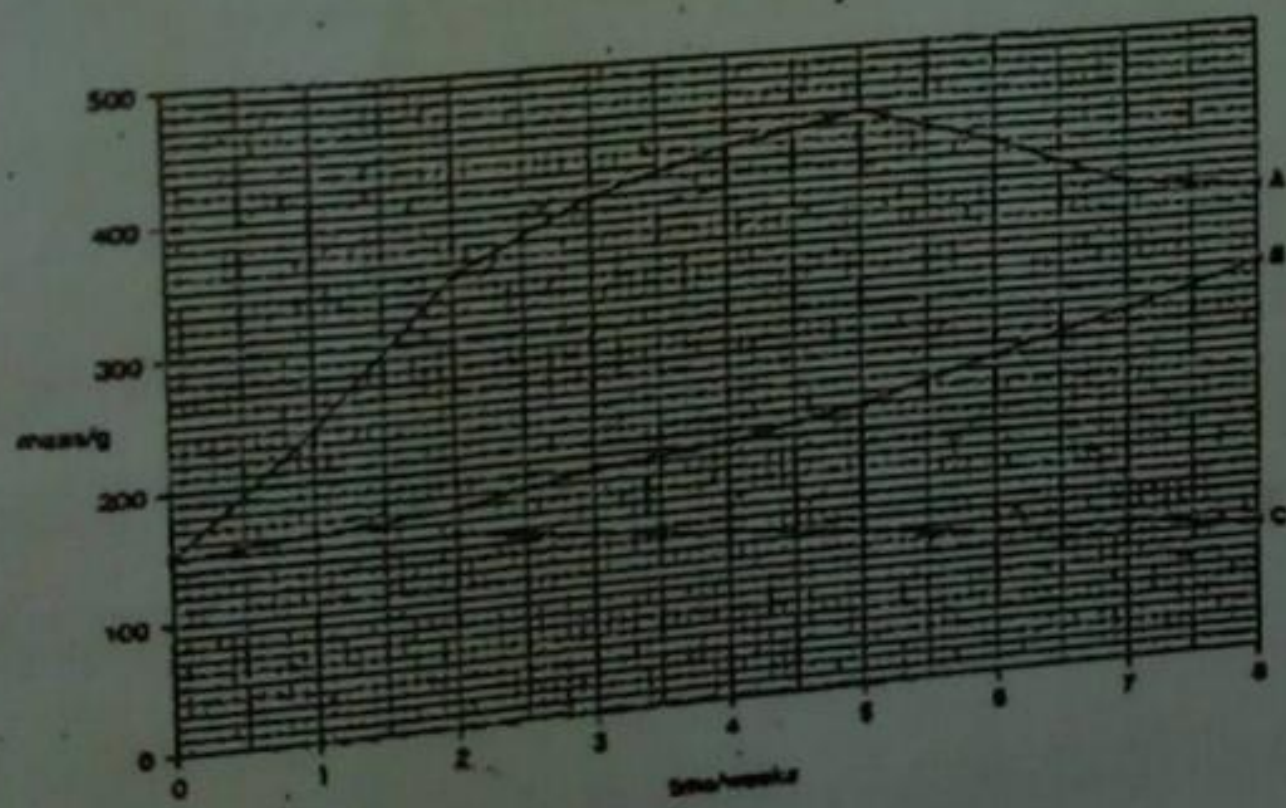


Fig. 3.2

(a) With reference to fig.3.2, calculate the percentage increase in mass of the plant container A during the first five weeks of the experiment.(show your working.

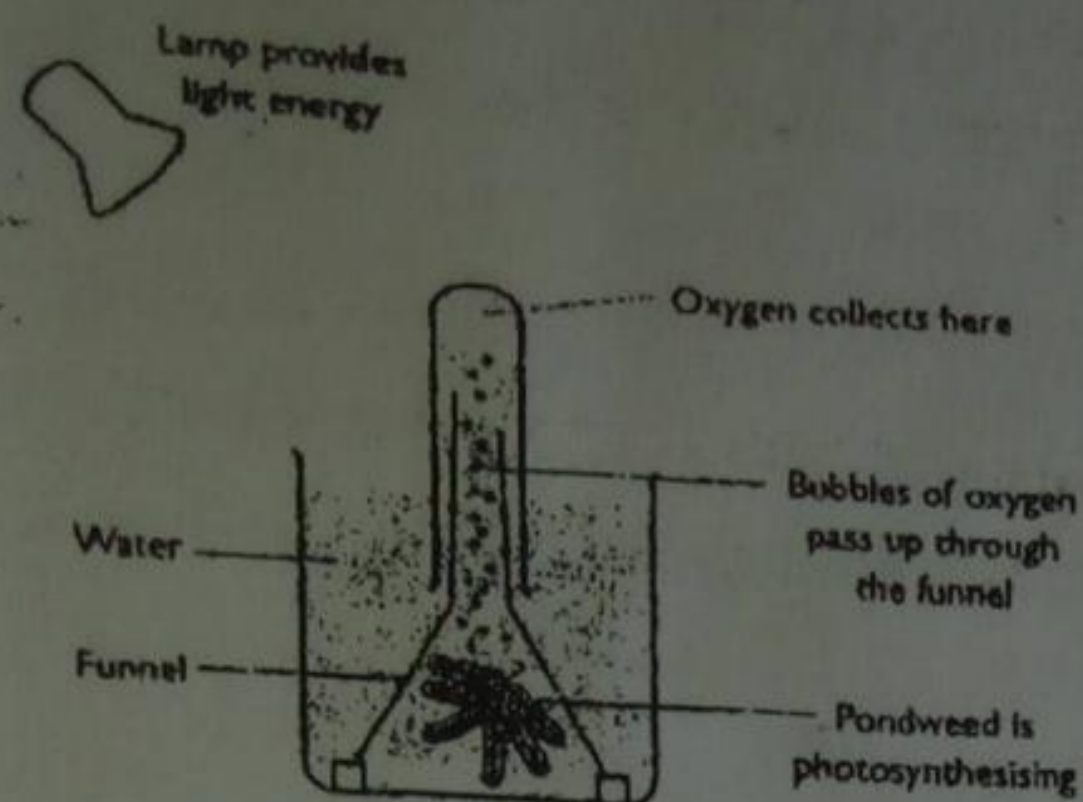
Ans.

The percentage increase in mass

$$= \frac{\text{the mass after five weeks} - \text{original mass}}{\text{original mass}} \times 100 = \frac{450 - 150}{150} \times 100 = 200$$

200% of mass increased and became 300% of original mass

(b) Suggest why the mass of plant container A began to decrease after week 5, while the mass of plant in B continued to increase.



b. Explain how fungi obtain carbohydrate they need for their metabolic processes.

Ans.

They grow on the dead or living organisms and produce enzymes to digest the cells and their contents. They absorb the nutrients from the cells into their hyphae – this is called external digestion. It is a cause of decay and they can get carbohydrates.

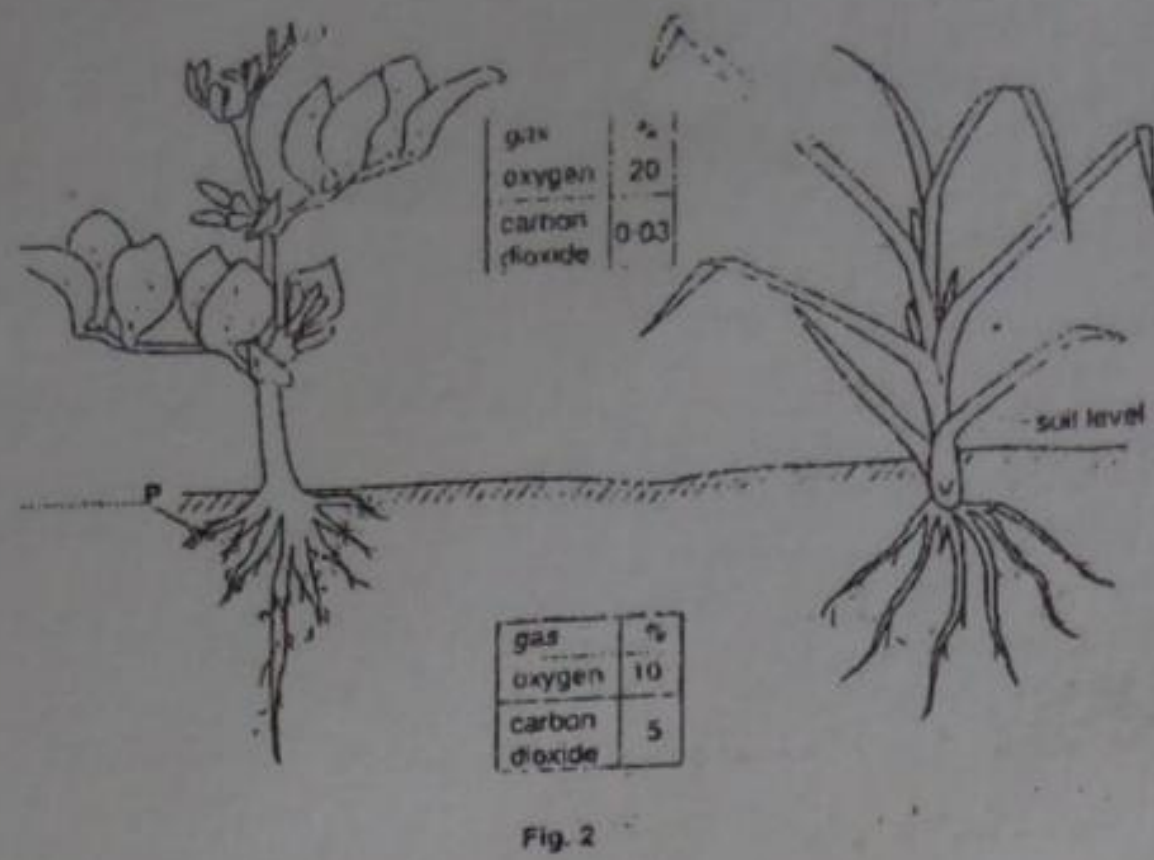
4. Describe, with explanations of each stage and giving full practical details how you would show that light is necessary for photosynthesis.

Ans.

Firstly the chlorophyll in chloroplasts absorbs light and synthesizes ATP using its energy. At the same time, oxygen gas released from the water molecules is transported from roots and the hydrogen atoms of water molecules are passed on NADP (nicotinamide adenine dinucleotide phosphate) to form NADPH_2 . These processes are called light reactions. To proceed this light reaction, light is indispensable.

Consequently, dark reaction occurs. In this reaction, carbon dioxide from the atmosphere is taken into Calvin cycle in which glucose is synthesized using the carbon dioxide, hydrogen atoms from NADPH_2 and the energy provided by ATP. This is the completion of photosynthesis. We can show that light is necessary for photosynthesis using water plants. Firstly, two sets of apparatus should be set to collect oxygen bubbles from a water plants using a funnel and a test tube. Put one apparatus under light the other in dark for a day. The result will be that the test tubes can collect oxygen only from the water plant under light. This result can be the evidence for that light is essential to produce oxygen, i.e. to proceed photosynthesis.

5. Fig.2 shows a leguminous plant (bean) and non-leguminous plant (grass) growing side by side in a field.



(a) (i) on the diagram, label structure P.

Ans.

Root nodule

(ii) Structure P contains organisms. To which group do they belong?

Ans.

Bacteria (kingdom prokaryote)

The tables in fig.2 show the percentages of carbon dioxide and oxygen in air above and below the soil during the day.

(b) Account for the differences in percentages of each of the gases above and below the soil.

Ans.

Carbon dioxide : the percentage of carbon dioxide below the soil is much higher than that above the soil because the roots and a lot of bacteria in the soil are producing carbon dioxide by respiration.

Oxygen: the percentage of oxygen above the soil is higher than that below the soil because the leaves above the soil produce oxygen by photosynthesis.

(c) Which important molecule in plants are made during nitrate absorbed from the soil?

Ans.

Amino acids

It has been shown experimentally that bean plants absorb less nitrate from the soil than grass plants, yet they show healthy growth.

(d) Account for this healthy growth of the bean plants.

Ans.

Because the bacteria living in the root nodules of the bean plants fix nitrogen gas to nitrate and provide it to the plants.

6. In some parts of the world, crop plants are grown in glasshouses (greenhouses), similar to increase their rate of growth and development.

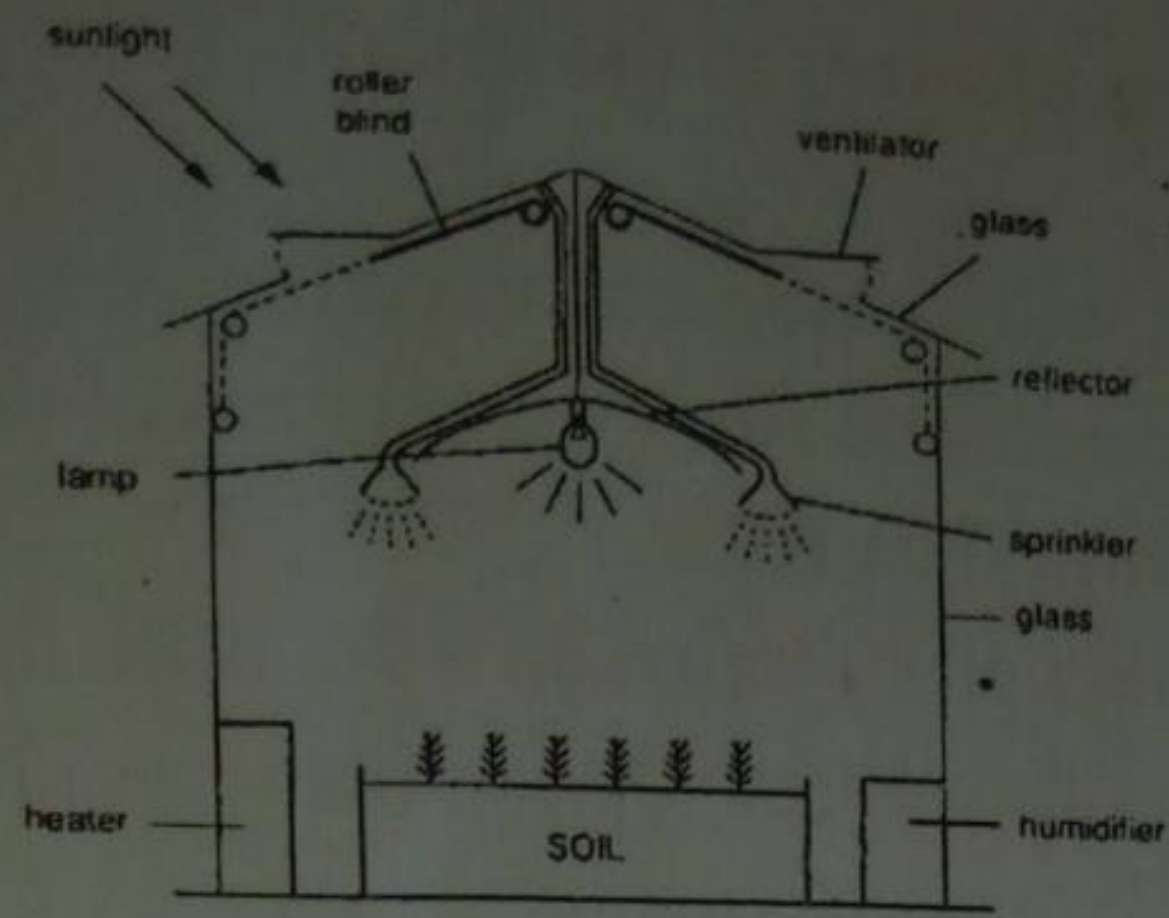


Fig. 5

(a) Suggest functions for each of the following features shown in fig.5.

(i) Ventilator

Ans.

It facilitates gaseous exchange, i.e. allowing oxygen and carbon dioxide enter and exits the glass houses (respectively).

(ii) Heater

Ans.

It can keep the ideal temperature under which the rate of photosynthesis will be high.

(iii) Blind

Ans.

It regulates the ideal intensity of sunlight, it also controls the length of the day.

(iv) Lamp and reflector

Ans.

Lamp provides light to the plant anytime and reflector can increase the efficiency of the lamp and control the amount of light to be supplied to the plant.

(b) Suggest which might be supplied to the greenhouse to increase the rate of plant growth.

Ans.

Carbon dioxide

(c) It is often important to use the humidifier when seedlings are first planted in the glasshouse.

Explain why it is so.

Ans.

Roots of the seedlings cannot absorb water from the soil just after being planted, so to reduce the loss of water from the leaves, the air in the greenhouse must be kept humid.

(d) Name an element, present in compounds in the soil, which is necessary for the healthy of the plants.

Ans.

(i) Nitrogen

(ii) What is the function of this element in the plant?

Ans.

Nitrogen from the soil will combine with carbohydrates to make proteins in plants. (So nitrogen is essential for the formation of proteins)

5.3 Animal nutrition

1. Fig.5 shows an X-ray photograph of one half of a person's jaw with the canine teeth labeled. The lightest areas on the X-ray indicate tooth fillings. One of the teeth shown is no longer alive.

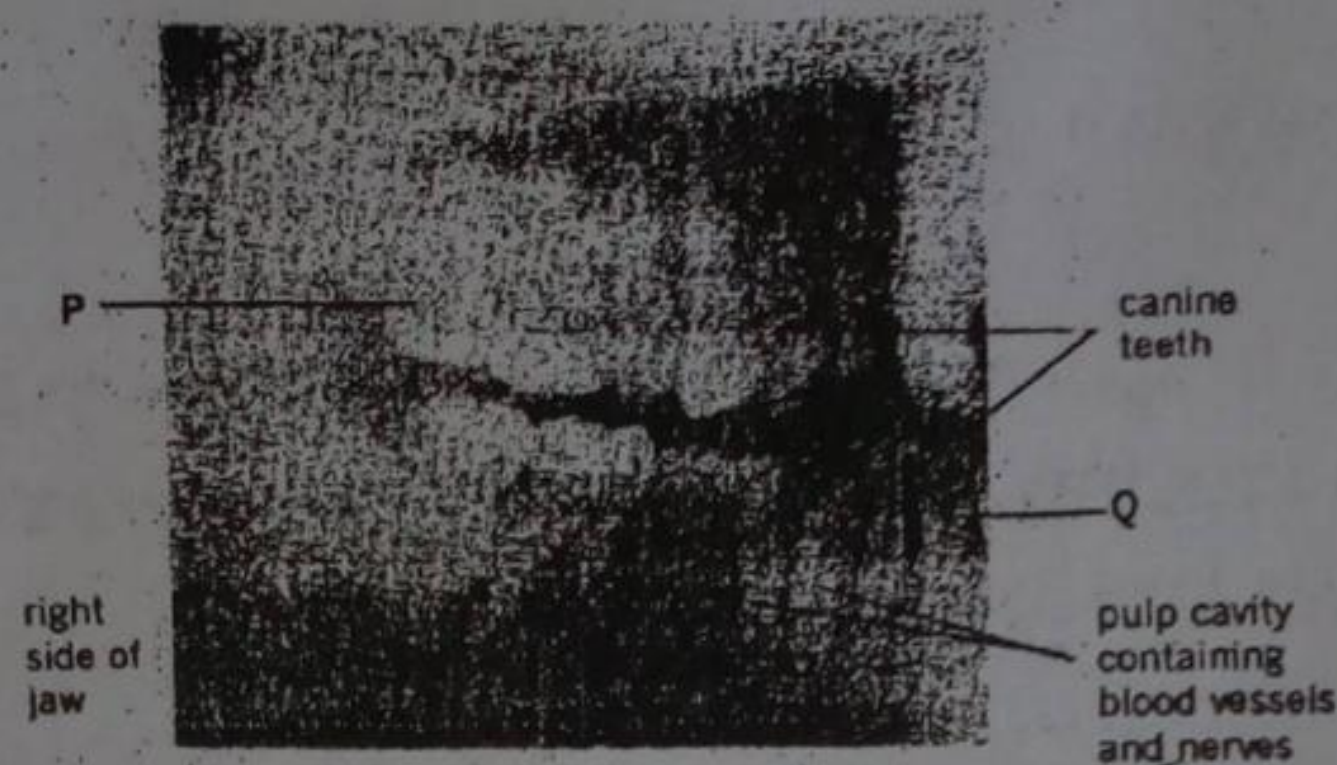


Fig. 5

Complete the table below how many of the different have been filled

	Number of teeth filled in upper jaw	Number of teeth filled In lower jaw
Incisors	1	0
Premolars	1	0
Molars	3	2

(b)(i) On figure 5, place an X over the tooth which is no longer alive.

Ans.

(ii) Suggest why this tooth is no longer alive.

Ans.

Because this tooth's pulp cavity which supplies blood to this has been badly damaged.

(c) Describe the different functions of teeth P and Q.

Ans.

P: Grinding food

Q: Biting off food

(d)(i) What chemical change may occur to food whilst it is in the mouth?

Ans.

Starch is broken down into maltose

(ii) What is responsible for bringing about this change?

Ans.

Salivary amylase

6. Transport in flowering plants

1. (a) Describe and explain how water move

(i) into a plant root

Ans.

Water in the soil enters the cytoplasm of the root hair cells by osmosis because the cytoplasm has a higher concentration of solutes than the solution in the soil

(ii) from the root into the stem

Ans.

Water moves from the root to the stem (the upper parts of plants) through xylem vessels, because the transpiration at leaves sucks up the water in the xylem vessels.

(ii) from a leaf to the atmosphere.

Ans.

The water in spongy cells and palisade cells evaporates into the air space among the spongy cells. Then the water vapour diffuses out to the atmosphere through stomata by diffusion.

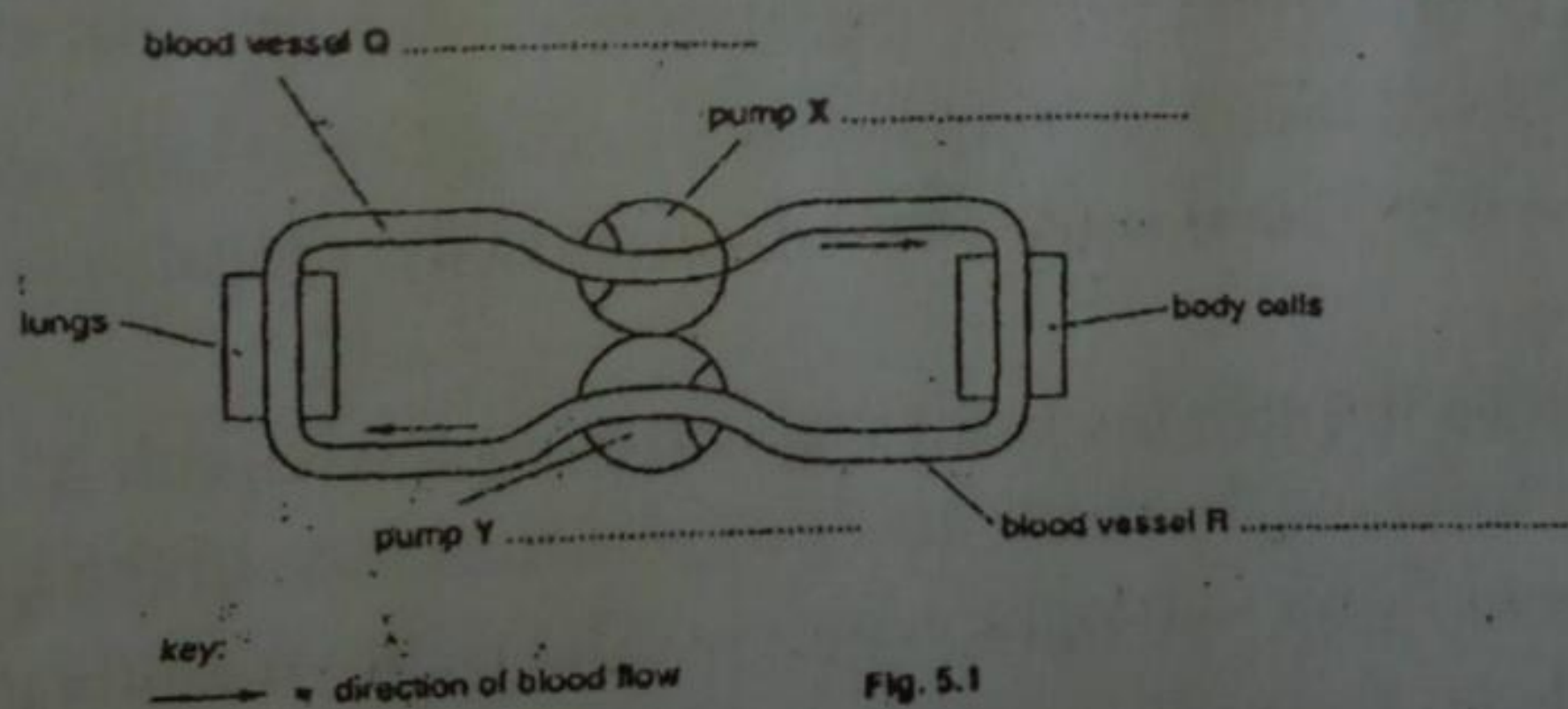
(b) What are the functions of water in a plant?

Ans.

Water works as a reactant for photosynthesis, supports a plant body by making its cells turgid and transports substances by acting as solvents.

Transport in Man

1. Fig 5.1 represents the circulatory system, the lungs and body cells.



(a) On fig. 5.1,

(i) Label blood vessel Q and R;

Ans.

Q: Pulmonary vein

R: Vena cava

(ii) Identify pumps X and Y.

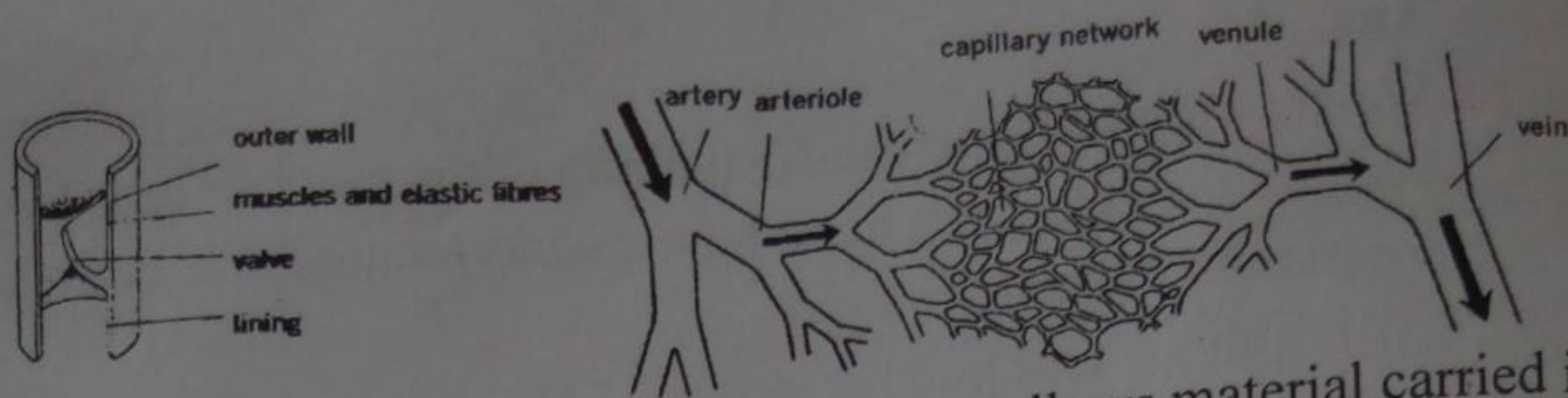
Ans.

X: Left ventricle

Y: Right ventricle

(b) In the space below, draw a labeled diagram of a transverse section of a blood capillary.

Ans.



- (c) Explain how the structure of a blood capillary allows material carried in the blood to reach a cell in the body.

Ans.

Blood capillaries are very small and penetrate to every part of the body so that no cell is very far away from the capillary. And their walls are only one cell thick, therefore, a blood capillary can take materials to a cell easily.

- (d) State the chemical, other than a respiratory gas, which passes in increased amounts
- (i) From capillaries to muscle cells at the start of a race

Ans.

Glucose

- (ii) From the muscle cells to capillaries after an extended period of exercise.

Ans.

Lactic acid

2. (a) List the structural features of a vein which distinguish it from artery.

Ans.

1. The wall is relatively thin. (thin muscle layer)
2. There are valves to keep blood moving in one direction.

- (b) Describe and explain how blood flows from the foot to the lungs.

Ans.

- (i) The blood passes twice through the heart on each complete circuit of the body.
- (ii) The blood flows up from the foot to heart through vena cava. In the heart, blood enters right atrium and flows into right ventricle. The right ventricle pumps the blood to the lungs. In the heart there are also valves and blood flows only correct direction. Blood flows into lungs through pulmonary artery.

3. Figure 1.1 shows a short length of a blood vessel.

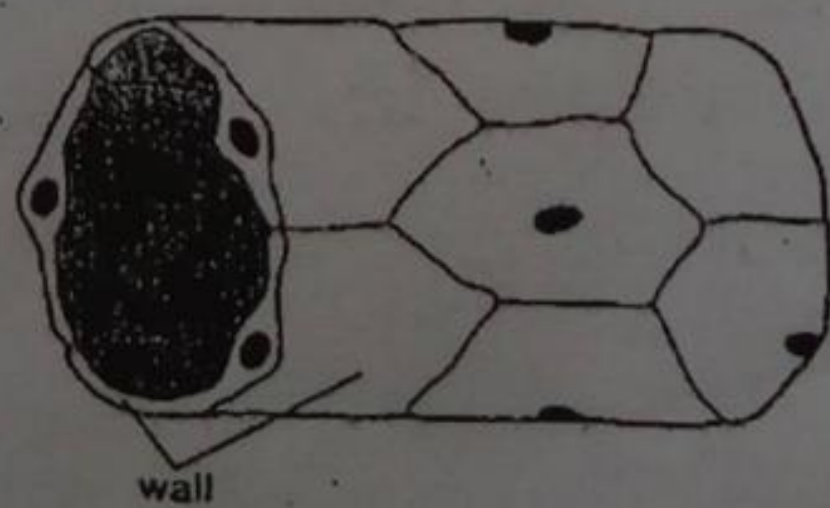


Fig. 1.1

- (a) (i) What type of blood vessel is shown in fig,1.1?

Ans.

Capillary

(ii) Explain how the wall is suited to the functions of this blood vessel

Ans.

A single cell layer wall easily allows the exchange of materials (e.g. oxygen) with surrounding tissues.

Figure 1.2 shows the pressure of the blood as it completes one circulation of the body (excluding the lungs).

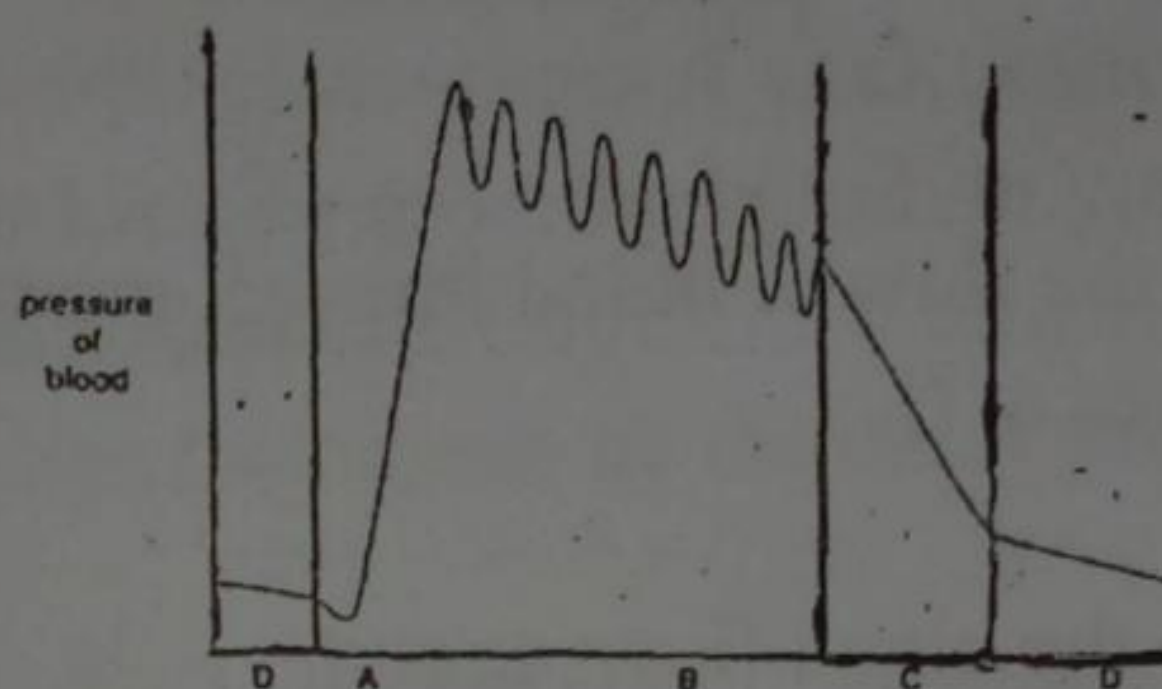


Fig. 1.2

(b) State which labeled section of the graph shows the pressure of the blood as it passes through arteries; veins; capillaries; the heart.

Ans.

Arteries : B Veins: D Capillaries: C The heart: A

(c) Explain how blood pressure might be affected by eating foods rich in animal fats and cholesterol.

Ans.

Because the aorta must send blood to all parts of the body and muscle of left ventricle is very thick while pulmonary artery sends blood only to the lung and muscle of right ventricle is not so thick.

(d) Explain how blood pressure might be affected by eating foods rich in animal fats and Cholesterol.

Ans.

Their deposits build up on the inside of blood vessels, making them stiffer and narrower. This leads to high blood pressure.

4. Fig 6 shows a ventral ("front") view of the human heart.

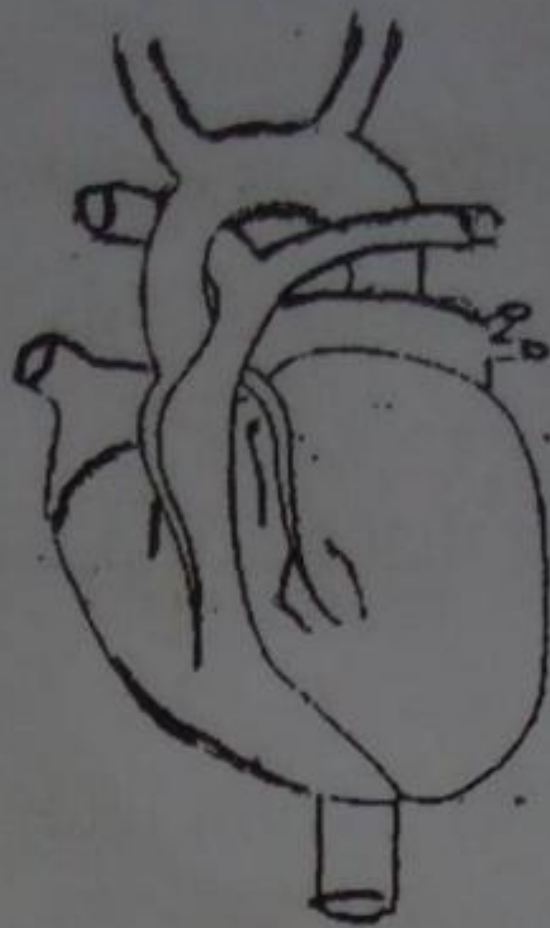


Fig. 6

- (a) Describe and explain the flow of blood through the heart from the time that it arrives at P to the time it leaves at Q.

Ans.

After passing point P, the blood flows into the right atrium. Then the blood is pumped to the right ventricle, which pumps blood out through the pulmonary artery to the lungs. After passing lungs, the blood comes back to the heart through the pulmonary vein and enters the left atrium. Then left atrium pumps the blood to the left ventricle, which pumps the blood out through the aorta, passing the point Q to whole parts of the body.

Explain the relationship between blood and tissue fluid.

Ans.

Tissue fluid is the blood plasma which has leaked out from blood capillaries.

5. (a)

- (i) Explain with named examples, how essential substances carried in the blood capillaries reach the cytoplasm of the blood cell.

Ans.

Essential substances, such as oxygen and glucose, diffuse out through the walls of the blood capillaries into tissue fluid that fills spaces between the body cells. Then the oxygen diffuses into their cytoplasm and glucose is taken in by active transport.

- (ii) Describe the uses of these substances in the cells

Ans.

The oxygen and glucose are used for aerobic respiration to produce energy. Some of the glucose is converted into glycogen and stored in the cells.

- (b) Explain how the blood system carries a named waste product from the liver to the Kidneys.

Ans.

The plasma carries urea produced in the liver to the kidney, where it is filtered and excreted.

8. Respiration

1. Figure 10.1 shows structures associated with breathing and gaseous exchange.

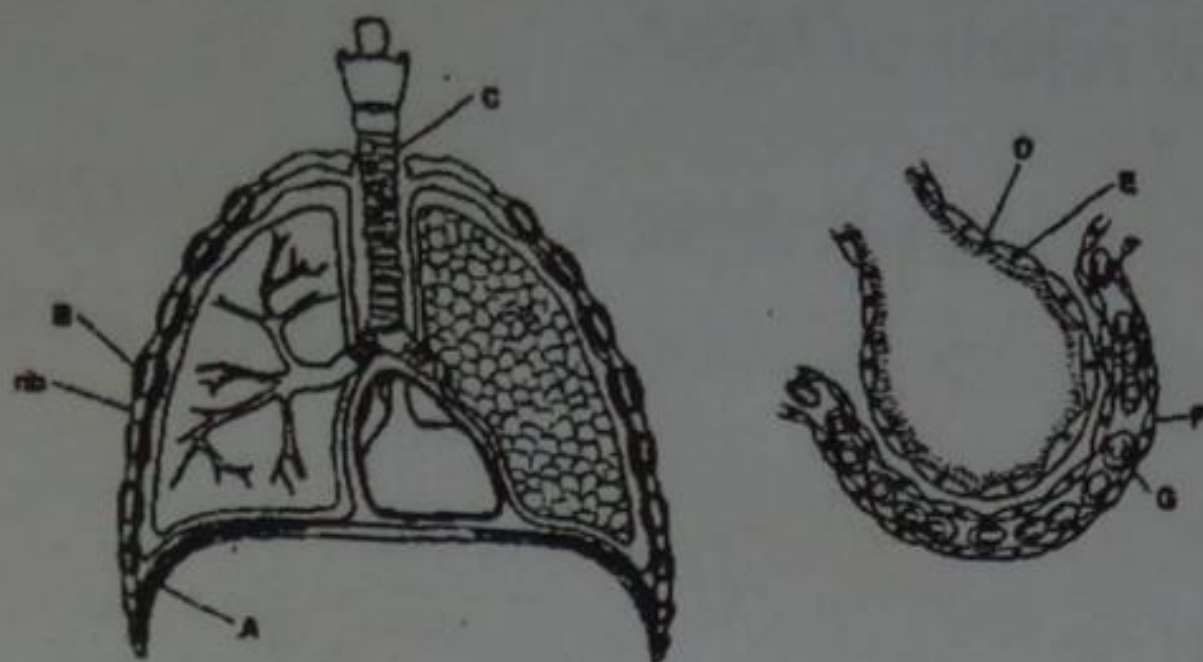


Fig. 10.1

Describe the roles of the labeled structures A to G, from the moment air enters the nose until the time oxygen leaves the lungs in the blood. In your answer, you should clearly identify each of the labeled structures.

- A:** diaphragm – contracts and flatten out, so the chest gets larger and lets air enter the lungs
- B:** inter costal muscle – contract and pull the ribcage upwards so the chest gets larger and lets air enter the lungs.
- C:** Trachea – lets air pass through from nose and mouth to lungs and clean the air by ciliated cells.
- D:** Moisture air – makes gases dissolve into blood more easily.
- E:** wall of capillary – very thin and permeable, so gases can pass into blood easily through the wall.
- F:** wall of alveoli – very thin and close to alveoli, so gases diffuse in and out the blood easily.
- G:** red blood cell – receive oxygen from alveoli and carry it all parts of the body by hemoglobin.

9. support, movement and locomotion

1. Figure 2.1 shows an X-ray photograph of a broken right arm (front).



Fig. 2.1

- (i) Name the broken bone

Ans.

Humerus

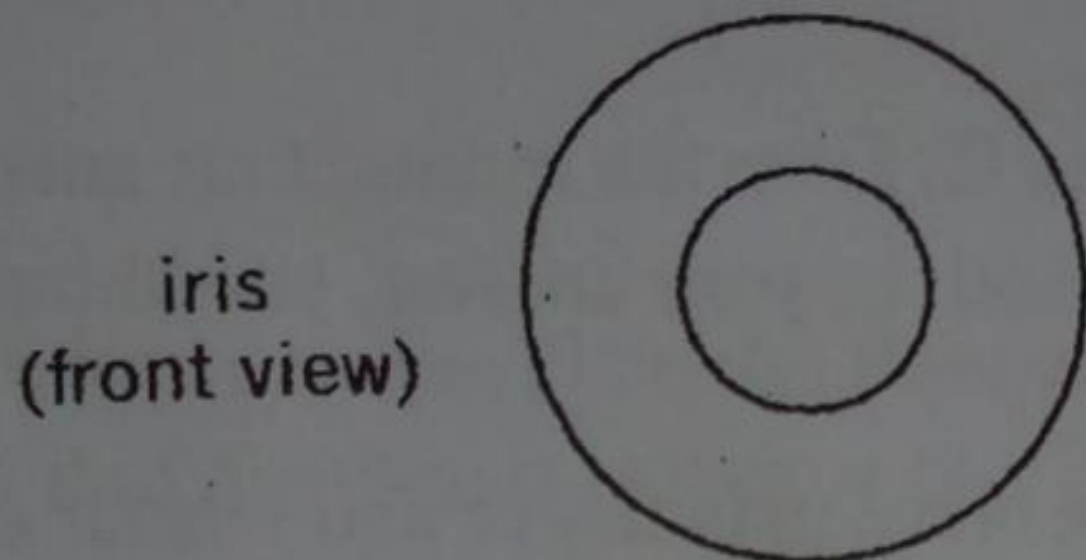
(ii) Name two nutrients required by the body for repair of bone.

Ans.

1. Calcium
2. Vitamin D

On fig.2.1,

(b)(i) Draw a circle round a ball and socket joint



(ii) Place an X over the bone to which the lower end of the biceps muscle is attached. The biceps is one of a pair antagonistic muscle. Another example of muscles working antagonistically is in iris of the eye.

(c)(i) Explain the antagonistic action of the iris muscles

Ans.

When radial muscles contract, the pupil becomes wide.

(ii) On the outline diagram of the iris below, draw and label the antagonistic muscles.

Ans.

When circular muscles contract, the pupil becomes narrow.

10. Excretion

1. (a) Explain what is meant by the following term:

(i) Ingestion

Ans.

It is the process to take food into the body by the mouth.

(ii) Digestion

Ans.

It is the process by which food is broken down into simpler chemical compounds in the alimentary canal.

(ii) Absorption

Ans.

It is the process by which cells and bloodstream take nutrients from the alimentary canal.

(b) Where, in a mammal, are the following substances stored and what part does each play in mammal's metabolism?

(i) Carbohydrates

Ans.

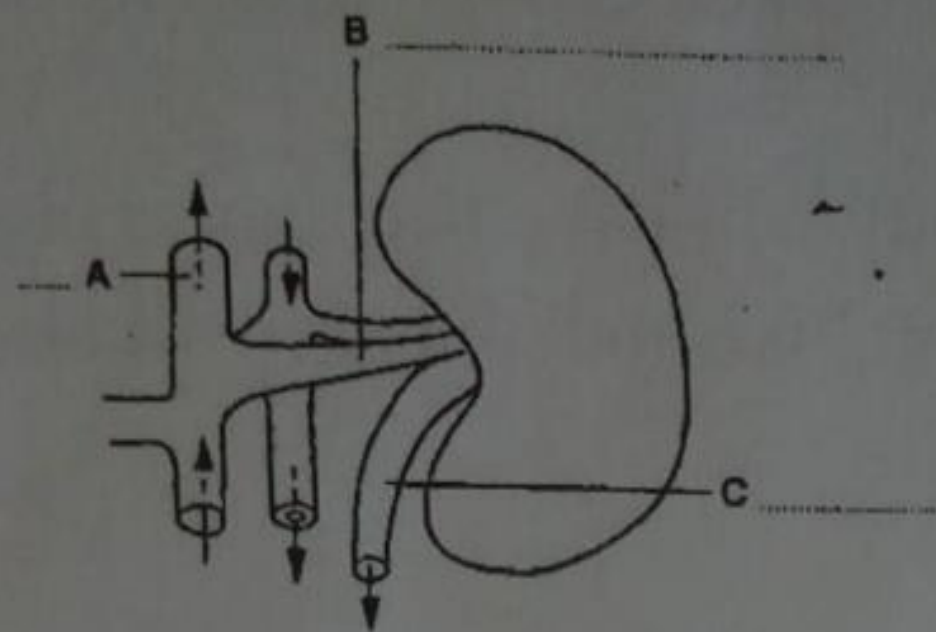
Stored in liver / play in blood

(ii)Fats

Ans.

Stored in adipose tissue / play in lymph (iii)

2. Fig.2 shows a diagram of a kidney and associated structures.



The tables list the percentages of certain components found within structures B and C.

In structure B

Component	Concentration/%
Urea	0.03
Glucose	0.10
Amino acids	0.05
Salts	0.72
Protein	8.00

Structure C

Component	Concentration/%
Urea	2.00
Glucose	0.00
Amino acids	0.00
Salts	1.50
Proteins	0.00

(a) On the diagram, label structures A, B and C.

Ans.

A: Vena cava

B: Renal vein

C: Ureter

(b) Which chamber of the heart first receives the contents structure A?

Ans.

Right atrium

(c) Using only the information in the tables in fig.2, deduce the functions of the kidney.

Ans.

The kidney can reabsorb all the glucose, amino acids and proteins. It also expels excess urea and salts which is not needed for the body.

(d) Explain how the proportions of the components present in C would change.

(i) After eating meat

Ans.

Main component of meat is protein. The protein is digested into amino acids and excess amino acids are converted into glucose and amino parts. The amino parts are changed into urea, so the proportion of urea will increase.

(ii) If a person suffering from diabetes had not taken enough insulin.

Ans.

The concentration of glucose in the body will have become so high that the kidney cannot reabsorb all the glucose. So some glucose will be reabsorbed in C.

11. Homeostasis

1. (a) Explain

(i) How during strenuous exercise, the human body temperature rises

Ans.

During strenuous exercise, the body uses muscles a lot. To provide energy for muscular contraction, the rate of respiration in muscles increases.

(ii) How the body temperature returns to normal when the exercise is over.

Ans.

To reduce the body temperature, sweat glands secrete sweat which deprives heat of the body when it evaporates, the blood flow to the skin increases to radiate heat into the air, and hair erector muscle relax to make hairs flat and help these evaporation and radiation.

(b) Account for the effect of exercise on

(i) The breathing rate

Ans.

The rise in the concentration of carbon dioxide in blood is sensed by medulla oblongata and it makes the breathing rate fast.

(ii) The pulse rate

Ans.

The heart beat rate is controlled by medulla oblongata, too and it becomes fast. As a result, the pulse rate becomes fast too.

2.(a) What is meant by the term homeostasis?

Ans.

Maintenance of a constant internal environment

(b) In what situations might a healthy person's blood glucose level be expected to

(i) Rise

Ans.

After a meal

(ii) Fall

Ans.

When insulin is secreted from pancreas

12. Co-ordination and response

1. (a) How are phototropism and geotropism

(i) Similar to each other

Ans.

Both of them are response to stimuli

(ii) Different from one another

Ans.

Phototropism is a response to light while geotropism is a response to gravity.

(b) For a named simple reflex action, describe the events which bring about the response.

Ans.

1. Knee jerk: brought about a sharp tap to the tendon below the patella.
2. Achilles jerk: contraction of lower leg muscle

(c) Explain why hormonal responses are slower than reflex actions?

Ans.

It is because messages are mainly transmitted in the form of electrical impulses in reflex actions while they are transmitted in the form of chemicals in hormonal responses.

2. Figure 3.1 shows some of the structures involved in a reflex action.

Muscles work as a pair to bend the arm at the elbow.

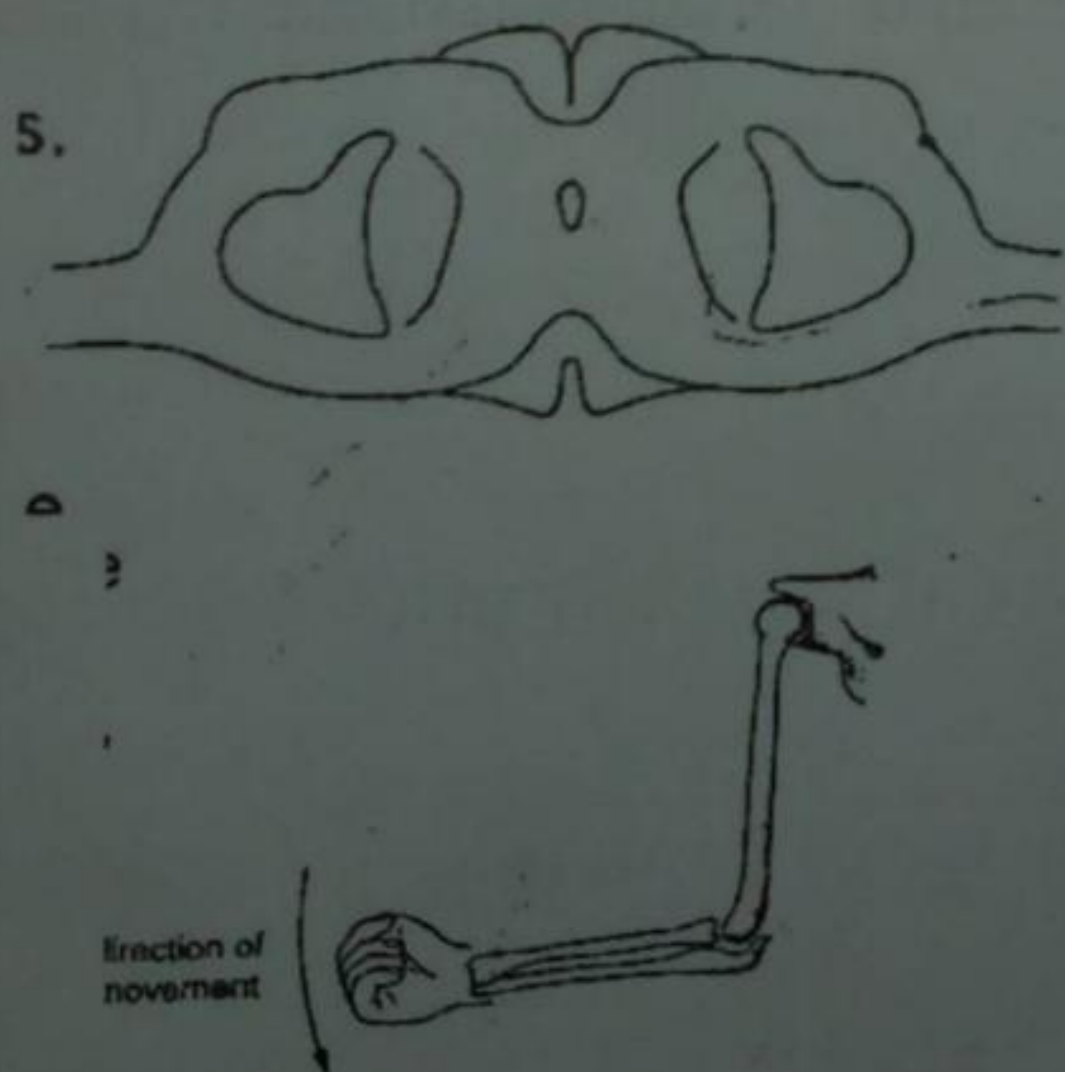


Fig.3.1

(a) (i) State the term used to describe such a pair of muscles.

Ans.

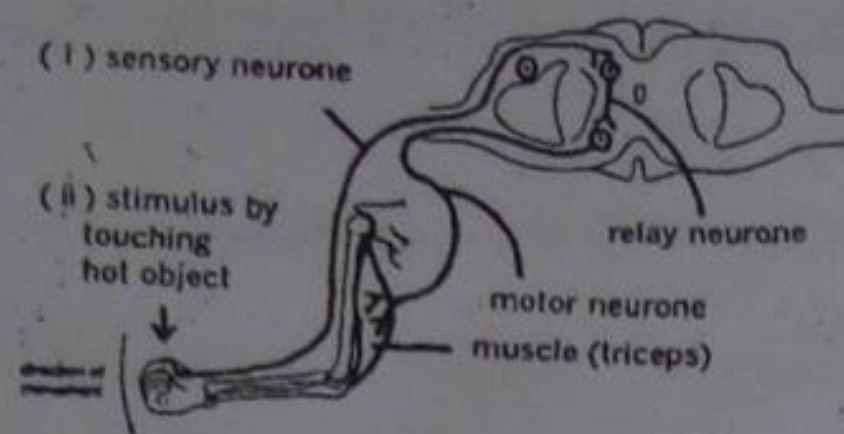
Antagonistic muscles

(ii) Explain why muscles are arranged in this way.

Ans.

Because when a muscle relaxes, it cannot push the bone back to their original position. Muscle can push the bone only when they contract. So muscles always operate as part of antagonistic muscle pair.

(ii) Complete Fig.3.1 by drawing in their correct positions and labeling the following structures involved in this reflex action: sensory neurone, relay neurone, motor neurone, muscles.



(ii) State three ways in which this action differs from a deliberate decision to lower the arm.

Ans.

1. This action is faster than a deliberate decision.
 2. This action do not involve the brain in making decisions but deliberate decision is involved.
 3. This action is an automatic process we are born with, but deliberate decision is from experience.
3. Fig.4 shows a person taking part in an experiment on the eye's response to light. The lamp was placed at different positions on the line A-B. Table 2 shows the diameter of the person's pupil when the light was placed at seven different positions.

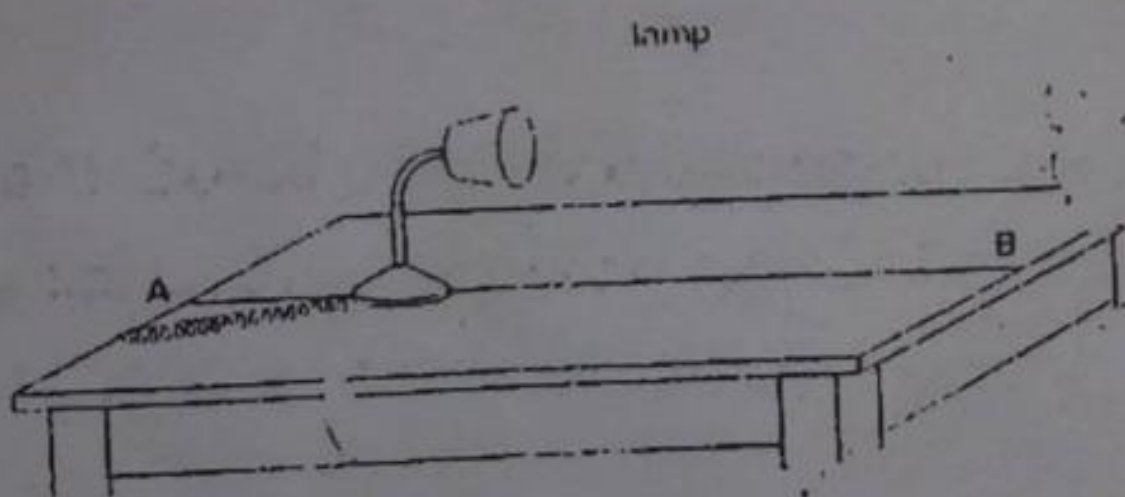


Fig. 4

Position of lamp	Diameter of pupil/min
1	3.1
2	4.0
3	4.5
4	4.9
5	3.8
6	2.4
7	1.7

(a) In which position was the lamp furthest from the eye?

Ans.

4

(b) Explain what is happening in the iris of the eye as the lamp moves from position 1 to position 2.

Ans.

The radial muscle of the iris contracts and the circular muscle relaxes to increase the diameter of the pupil.

(c) (i) What type of response is being shown by the eye?

Ans.

Reflex action

(ii) How does this response benefit the eye?

Ans.

By responding very fast, it prevents the retina from being hurt by strong intensity of light.

13. Tropism and taxis response

1. (a) Using examples, explain the meaning of the following terms: taxis response, voluntary action and hormone.

Ans.

Taxis response: it is the response movement of an organism bodily towards or away from stimuli. For example wood louse seeks humid area. So wood louse moves towards the stimulus of water.

Voluntary action: it is a chemical which involves the brain making a decision about how to respond to a particular stimulus. For example you feel thirsty (stimulus) and drink water (response).

Hormone: it is a chemical which is released from endocrine gland into the blood. It has an effect on target organs in the body. For example insulin is made in the pancreas (endocrine gland) and affects cells in the liver and muscles (target organs), causing them to absorb glucose from the blood and convert it to glycogen.

(b) How does

(i) A tropic response differ from a taxis response

Ans.

Trophic responses are response growth of a plant by stimuli.

Taxis responses are response movement of mainly invertebrates.

(ii) An involuntary action differ from a voluntary action

Ans.

Involuntary actions (reflex action) do not involve the brain in making decision and they are automatic responses to a stimulus.

(iii) An enzyme differ from a hormone?

Ans.

Enzymes control chemical reactions in the body. While hormones control target organs. So enzymes are released under the control of hormones. All hormones are carried by blood but enzymes are not.

2. Fig. 3A shows a section through the apparatus used in an experiment to investigate the behavior of some small invertebrates.

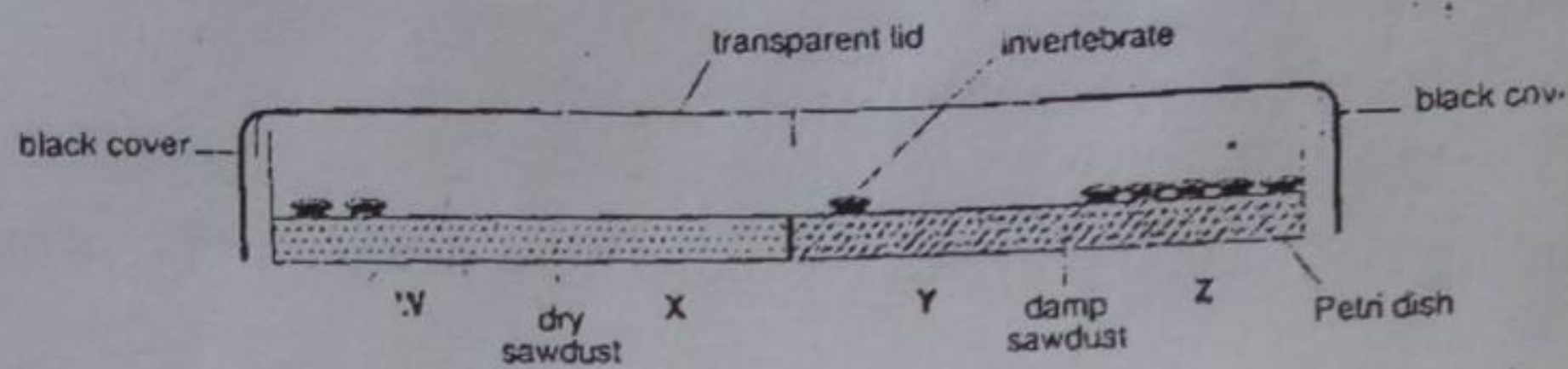


Fig. 3A

Fig. 3B shows a surface view of the same apparatus. 20 invertebrates were placed in the apparatus, left for 30 minutes and then the number in each region counted.

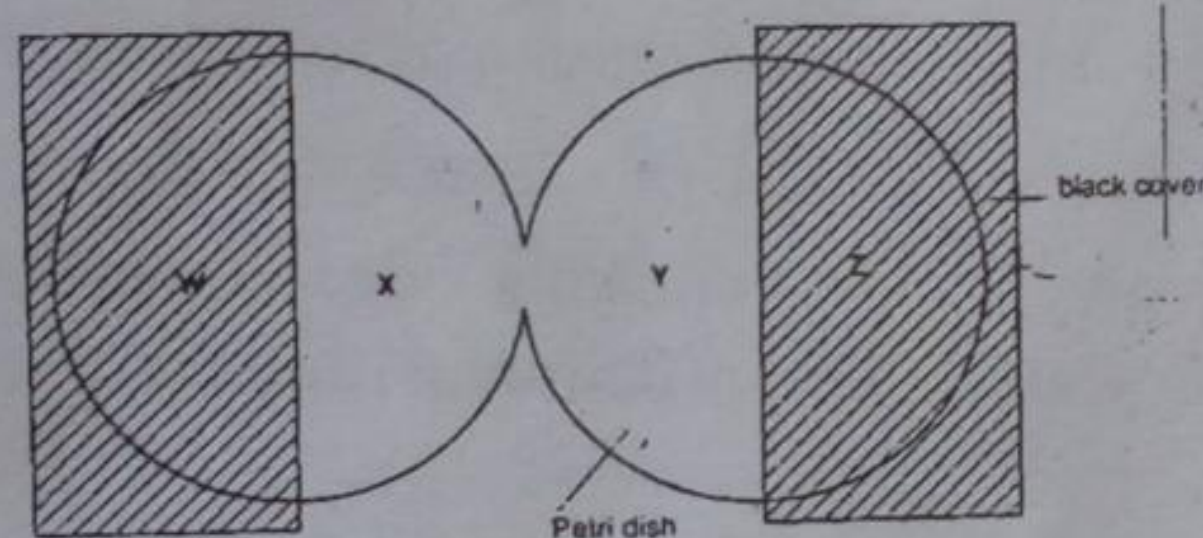


Fig. 3B

The results are shown in the table below.

Experiment	Region			
	W	X	Y	Z
1	2	0	4	14
2	5	0	7	8
3	2	1	4	13
4	0	3	3	14
5	1	1	2	16
Average number				

The experiment was carried out five times .

(a) (i) Calculate the average number of animals in each region of the apparatus to complete the table above.

Ans.

W: 2 X: 1 Y: 4 Z: 13

(ii) Explain why an average number is calculated in experiments of this type.

Ans.

To summarise the data obtained.

(iii) Why were the animals left for 30 minutes before counting them?

Ans.

To give them enough time to choose the region in which they want to stay.

b) Suggest which characteristic of living organisms is under investigation in this experiment.

Ans.

Taxis

(c) Describe the conditions in which

(i) Most animals were counted

Ans.

Dark and damp

(ii) Least animals were counted

Ans.

Bright and dry

(d) Suggest a habitat in which you might find these animals living naturally.

Ans.

Under fallen leaves in forest

4. The use and abuse of drugs

Fig 1.1 shows some cells from the lining of a human trachea.

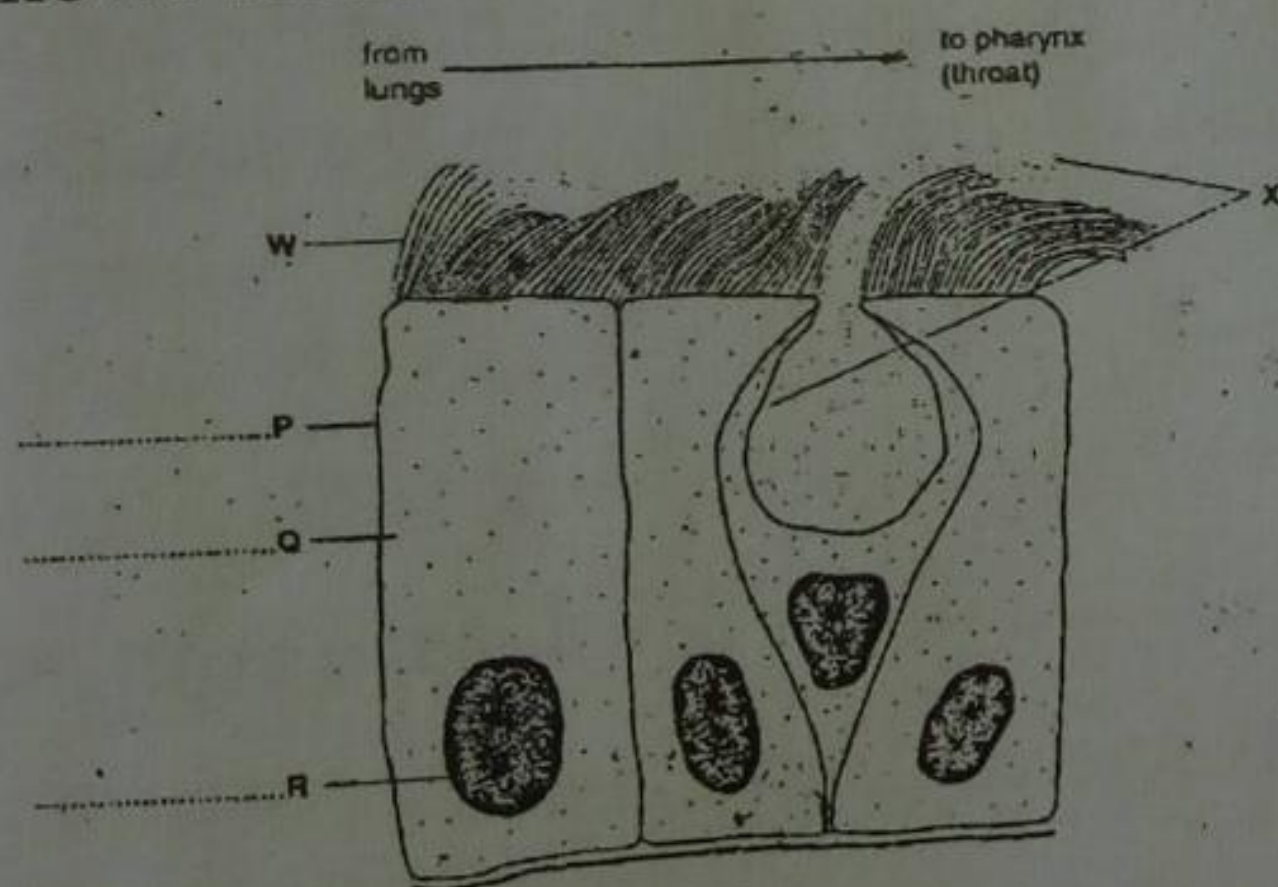


Fig. 1.1

(a) (i) On fig 1.1, label P, Q and R.

Ans.

P: Cell membrane

Q: Cytoplasm

R: Nucleus

(ii) Name the structures found in R.

Ans.

Chromosomes (DNA)

(iii) Identify W and X.

Ans.

W: Cilia

X: Mucus

@} Whatkins & Viney

(iv) Describe the functions of W and X.

Ans.

W: To remove dust and germs toward the pharynx

Smoking has a direct effect on W and X.

(b) (i) Name three harmful chemicals found in cigarette smoke.

Ans.

1. Nicotine
2. Tar
3. Carbon monoxide

(ii) Describe the effects that these and other substances present in cigarette smoke may have on W and X and also on other parts of the respiratory system.

Ans.

Effect on W: Cilia will be short and it becomes difficult to remove dusts.

Effect on X: Too much mucus is produced and they remain in the trachea. So germs may increase in mucus.

2.(a) Cancer and heart disease are two major causes of death. Explain how the following may contribute towards these diseases.

(i) Smoking cigarettes

Ans.

The chemicals found in the smoke of cigarette have had effects for cells. They change the cell in lungs malignant and those cells develop in lung cancer. The smoke can affect the coronary arteries on heart, too. It promotes the blockage of these arteries which stop the supply of blood to the heart. This causes heart attack.

(ii) Eating an unbalanced diet

Ans.

Too much fat in diet promotes the blockage of coronary arteries. It develops in heart attack.

(b) Why is smoking now widely regarded as a socially unacceptable habit?

Ans.

Because even people who do not smoke may be harmed by other people's cigarettes.

(c) Explain how dependency on a drug such as heroin can lead to infection with AIDS virus (HIV).

Ans.

Some of the drug users share unsterilised needles. HIV can remain alive on those needles and be infected to people who used them.

3.(a) Explain fully the harmful effect of smoking on

(i) In the lungs and air passages

Ans.

The smoke from cigarettes causes chronic bronchitis and emphysema. It also causes lung cancer.

(ii) The heart and circulation

Ans.

Smoking cigarettes promotes the blockage of the coronary arteries, which results in heart attack.

(b) Describe the dangers of over-consumption of alcohol. In your answer you should include both short-term and long-term effects.

Ans.

In short-term, over-consumption of alcohol makes people drunk and reduces reaction time. In long-term, it damages the liver due to over using it.

SECTION II – DIVERSITY OF ORGANISMS

1. Diversity of organisms

1. Fig 1 shows some organisms in their natural environment.

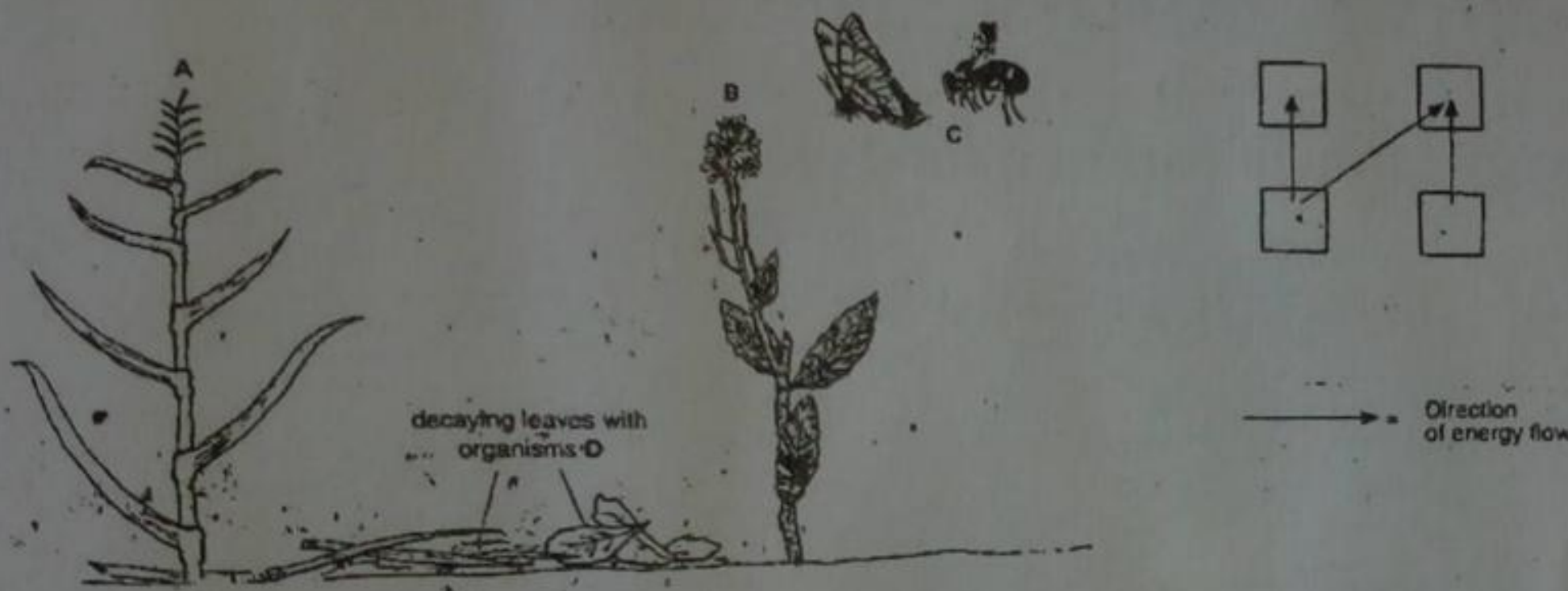


Fig. 1

(a) (i) A and B are two different flowering plants. To which group does each belong?

Ans.

Plant A: Monocotyledons (Class Monocotyledons)

Plant B: Dicotyledons (Class Dicotyledoneae)

(ii) To which group do animals C belong?

Ans.

Insects (Class Insecta)

(iii) State two visible features of organisms A, B and C which lead you to your identification.

Ans.

A: 1 Narrow leaves

2. Parallel venation in leaves

B: 1 Broad leaves

2. Net-like venation in leaves

C: 1 Six legs

2. Three segmented bodies

(b) Name one group of organisms D responsible for the decaying of the leaves.

Ans.

Fungi (kingdom fungi) or Bacteria (kingdom prokaryotae)

(c) Organisms A, B, C and D are linked in a simple food web. By which letters in the boxes below show how they are related.

@} Watkins & Viney

Ans.

C D

B A

(d) Name two mineral ions released by the decaying leaves. For each ion state its function in a plant.

Ans.

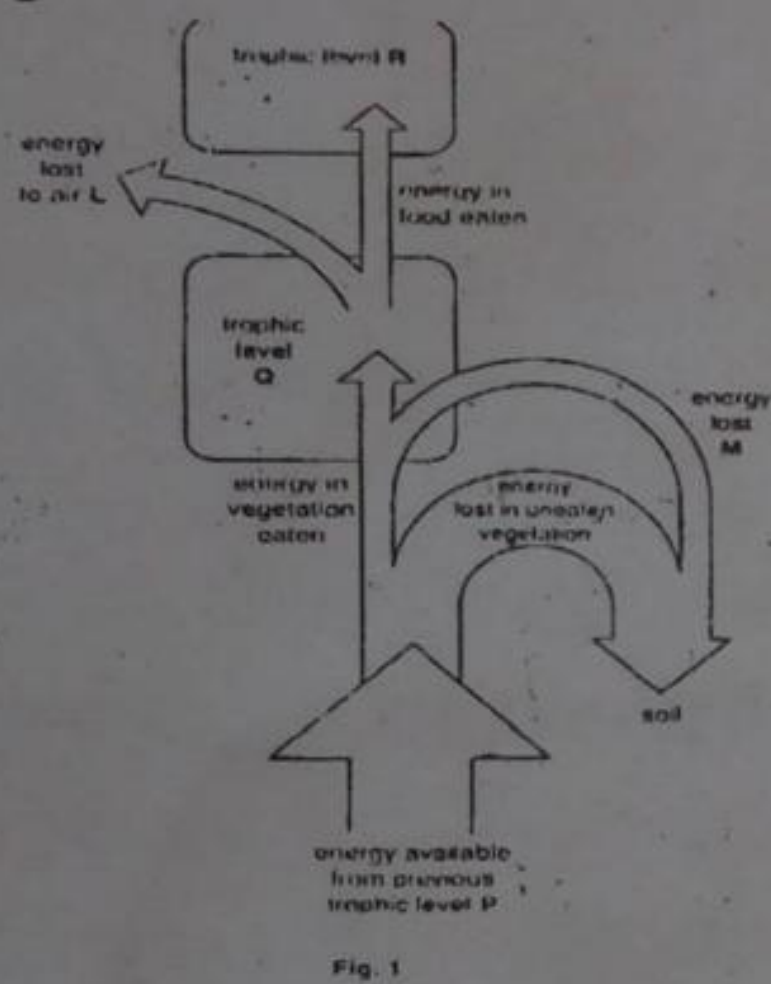
Mineral ion 1: Nitrate – function: Used for protein (amino acids) synthesis.

Mineral ion 2: Magnesium ion – Function: Used for chlorophyll synthesis

SECTION III - RELATIONSHIPS OF ORGANISMS WITH ONE ANOTHER AND WITH ENVIRONMENT

1. Energy

1. Fig.1 shows the flow of energy through part of a food chain.



Name trophic levels R and Q.

Ans.

R: Secondary consumer

Q: Primary consumer

(a) (i) State three possible uses of energy by the organism in trophic level Q.

Ans.

1. For movement
2. For the metabolisms in cells
3. For active transport

(ii) What processes are likely to be responsible for the losses of energy at L and at M.?

Ans.

L: Respiration

M: Engestion and excretion

(b) (i) In what form does the energy pass from trophic level Q?

Ans.

As organic food

(ii) Explain briefly how energy enters the food chain trophic level P.

Ans.

Green plants use the energy from sunlight to photosynthesize glucose from water and carbon dioxide.

2. Food chains and food webs

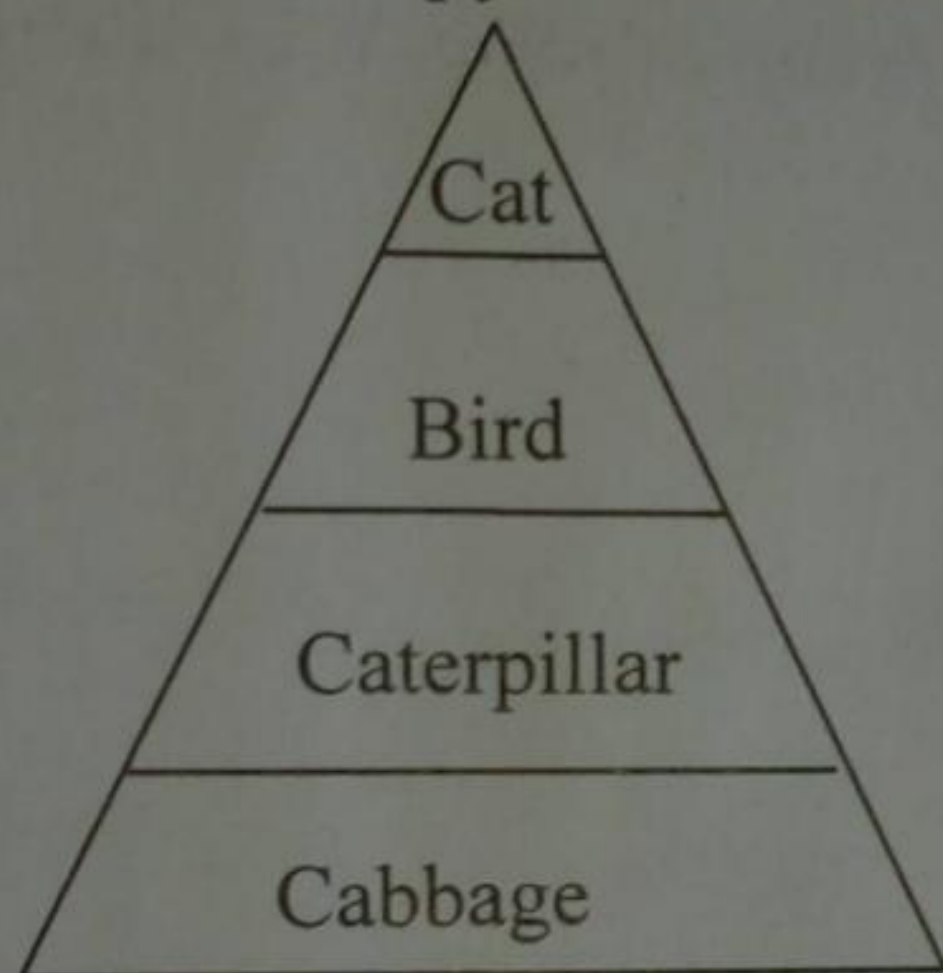
1. (a) (i) Give an example of a food chain involving four trophic levels.

Ans.

Cabbage – caterpillar – bird - cat

(ii) Draw and label a pyramid of energy for this food chain.

Ans.



(b) For the food chain, explain

(i) How energy passes through the chain

Ans.

Producers change light energy into chemical energy (in sugar) when they photosynthesize. Energy flows from one link to the next along the food chain as producers are eaten by consumers and consumers eat each other.

(ii) How energy is lost to the environment

Ans.

90% of energy is lost at each trophic level as heat by plants and animals through metabolic processes, as well as energy in feces and urine.

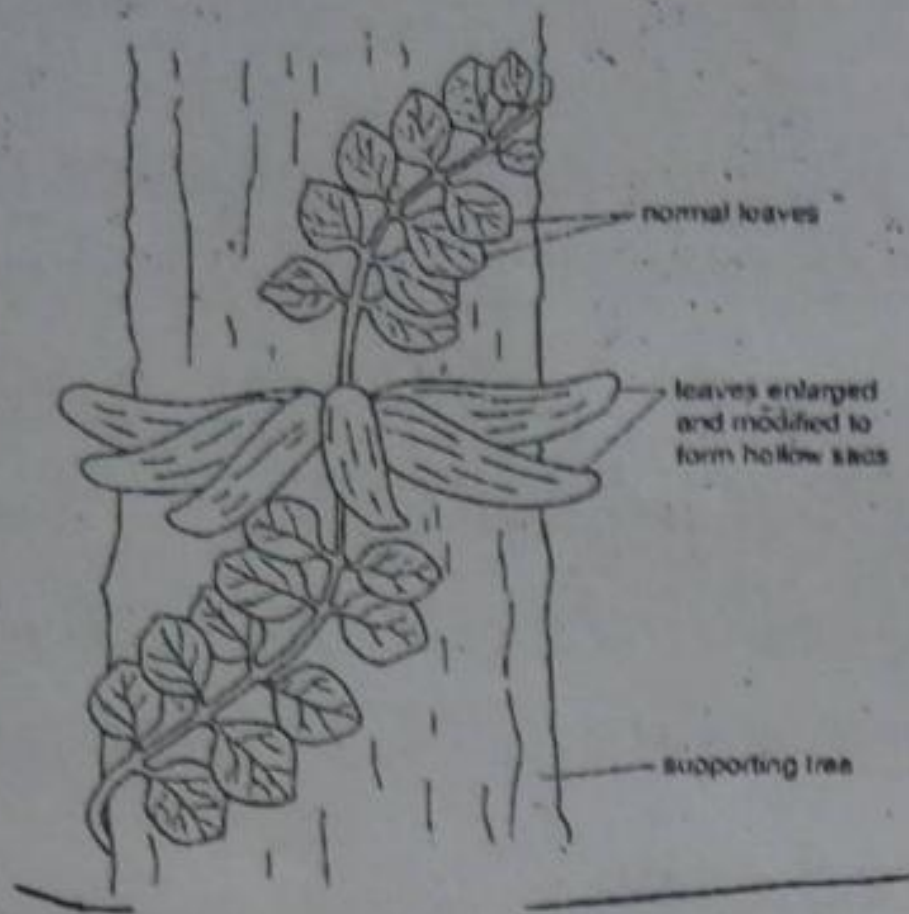
(c) Explain why it is considered inefficient to feed crop plants to animals.

Ans.

Because when plants are eaten by animals, most of the energy in the plant will be lost (see (b) (ii)). So the same area of land can provide about 10 times more plant proteins than animal proteins.

3. Nutrients and water cycle

1. Figure 4.1 shows a species of 'ant plant' and one of its modified, hollow, sac-like leaves cut to show the activities taking place inside the sac.



(a) From the appearance of its normal leaves, to which group of plants does the 'ant plant' belong? Give reasons for your answer.

Ans.

Group: dicotyledon

Reasons: this plant has netlike venation in leaves.

(b)(i) Name the process used by the plant to manufacture carbohydrate.

Ans.

photosynthesis

(ii) Explain how this process is of value to ants living in the modified leaves.

The plant benefits from the excretory products of ants.

Ans.

Oxygen needed for the ants is produced during the photosynthesis of the plant. Carbon dioxide produced during the respiration of the ants is consumed during the photosynthesis of the plant.

(c) Name a gas excreted by ants and state its value to the plant.

Ans.

Gas: carbon dioxide value to the plant: the plant can use carbon dioxide produced by the ants for photosynthesis.

1. Fig 1.1 shows a plant cell.

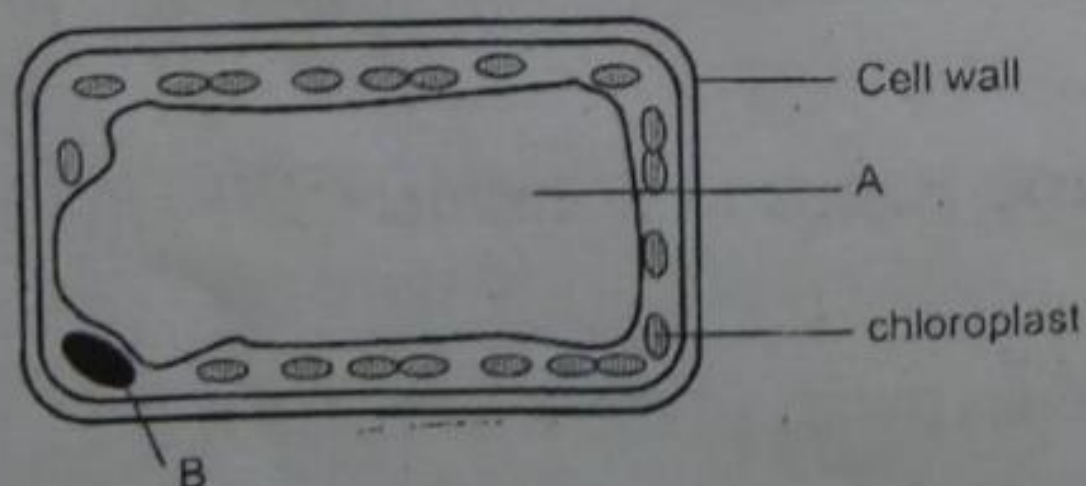


Fig. 1

(a) Identify and state the functions of the structures labeled A and B.

Ans.

(i) Structures A:

Vacuole

Functions:

- (1) Stores food, enzymes and other materials needed by the cell. It also stores waste products.
- (2) It collects excess water and pumps it out of the cell.

(ii) Structure B:

Nucleus

Functions:

- (1) To control all the cell activities as respiration protein synthesis cell division.
- (2) It stores hereditary materials such as DNA and RNA.

(b) List two differences between the plant cell shown in fig 1 and an animal cell.

Ans.

(i) Plant cells have cell walls round the cell membrane while animal cells do not have.

(ii) Plant cells have chloroplast which is absent in animal cells.

2. Figure 3.1 shows two cross sections from different parts of a dicotyledonous plant.

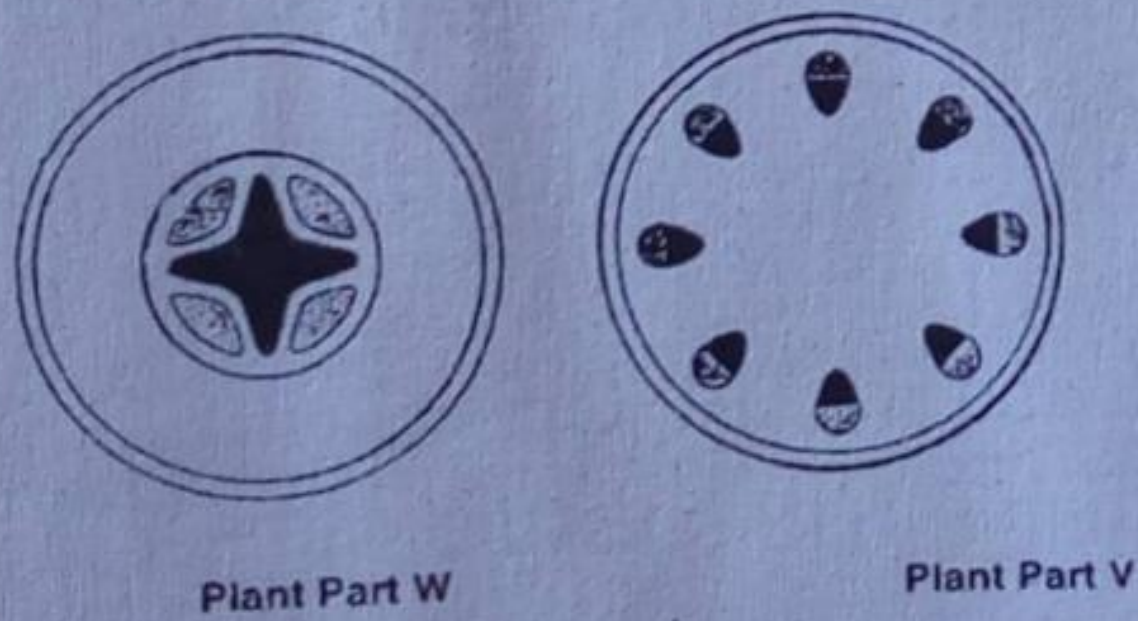


Fig. 3.1

(a) Which diagram shows the cross section of

Ans.

(i) Root

Plant part W

Explanation:

In dicots xylem forms a star-shaped mass at the center of the root, with phloem nested between the rays of the star.

(ii) Stem

Plant part Y

Explanation:

In dicot stems, xylem and phloem are arranged in bundles in the cortex.

(iii) What are the shaded regions in the diagrams? Give the reasons for their different distributions.

Ans.

Shaded regions are the xylem and phloem vessels (tissues).

Reason:

They have different distributions due to different functions they perform in both the stem and the root.

(b) Herbaceous stems and woody stems were clamped in water (fig.3.3) and concentrated salt solution (fig.3.4) as shown below.

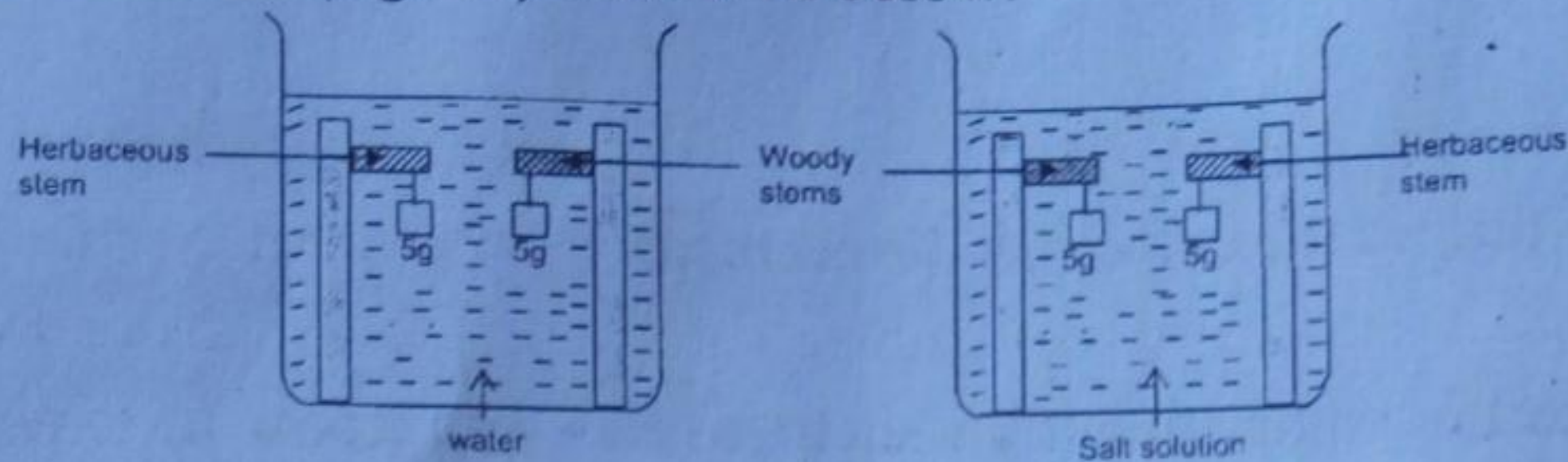


Fig.3.3

(i) Describe what will happen in fig. 3.3 and fig.3.4. Explain your answers.

Ans.

Fig.3.3. The cells and herbaceous stems clamped in plain water (hypotonic) fig.3.3 will increase in their turgor pressure than normal making the cell to swell.

Explanation:

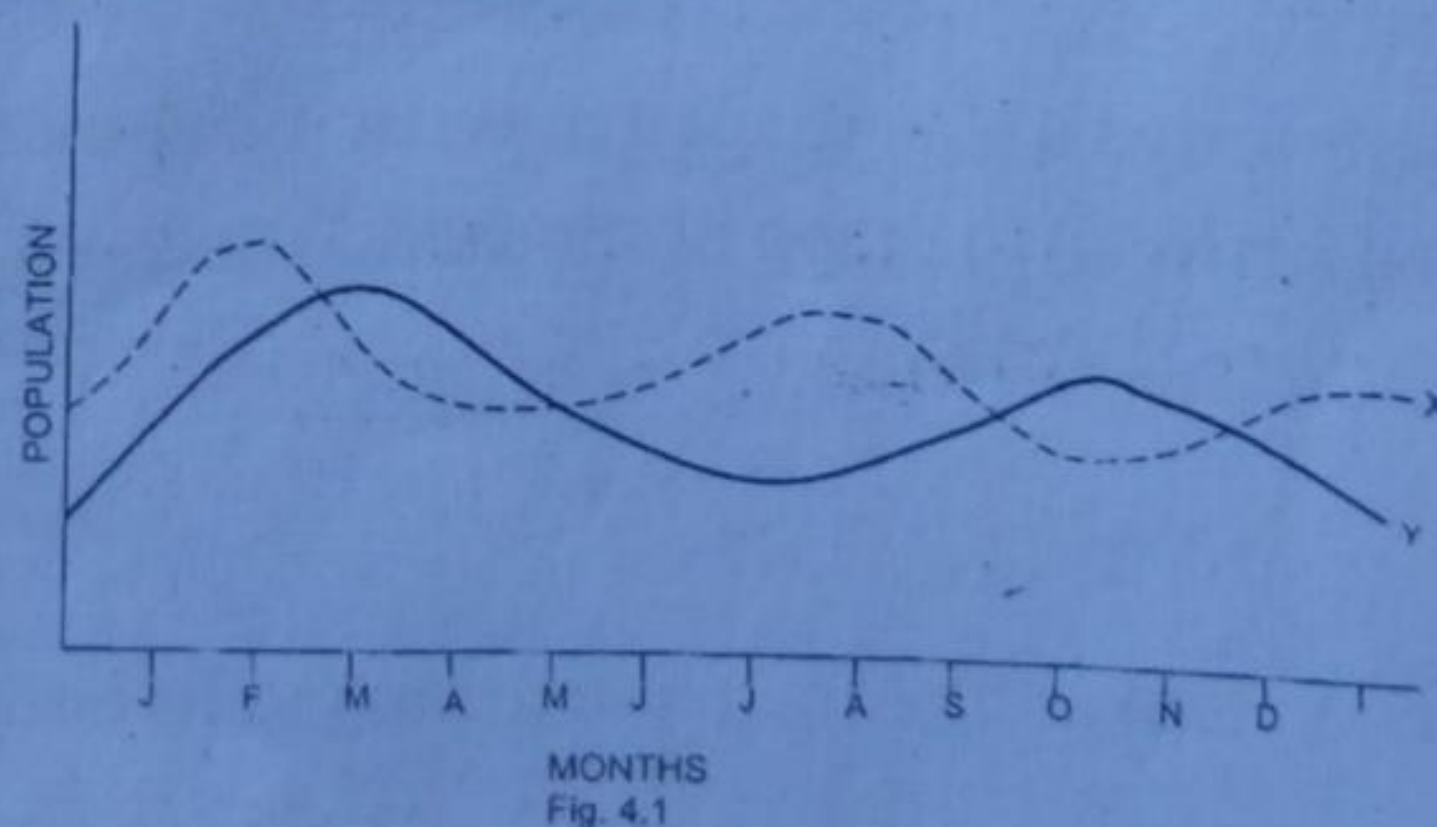
Turgor pressure causes the cytoplasm and plasma membrane to press outward against the cell wall making the cell rigid.

Fig.3.4. The cells of herbaceous and woody stems clamped in salt solution (hypertonic) fig 3.4 will lose their turgor pressure and become soft and limp.

Explanation:

Drop in turgor pressure due to loss of water mainly from the central vacuole will make the plasma membrane and cytoplasm shrink away from the cell wall.

3. Figure 4.1 shows the changes in size of a population of producers and of a population of consumers in a lake over several months.



(a) What is meant by producer in food chain?

Ans.

In food chain, producers are organisms which manufacture their own food from raw materials with their environment.

(b) Which graph, X or Y represents the consumers?
Explain your answer.

Ans.

(i) Graph X

(ii) Explanation;

The graph for consumers (population X) did not drop or decline like Y which was being preyed upon by population of consumers in X.

(c) The change in population size of the producers between the months of June and September was a result of farming around the lake. Suggest how farming methods may have caused this change.

Ans.

There was a further run-off from the farm fields to the nearby lake which caused a high proliferation of algae in the lake where bacteria used up much of the dissolved oxygen leading to the drop in the population of producer.

(d) A biologist studying the lake several weeks after September found that the size of both populations had fallen greatly while the number of bacteria were very high.

(i) What term is used to describe this effect?

Ans.

Eutrofication

(ii) What are the disadvantages of this process?

Ans.

Eutrofication results into the loss of dissolved oxygen in water leading to the death of organisms in the aquatic ecosystem.

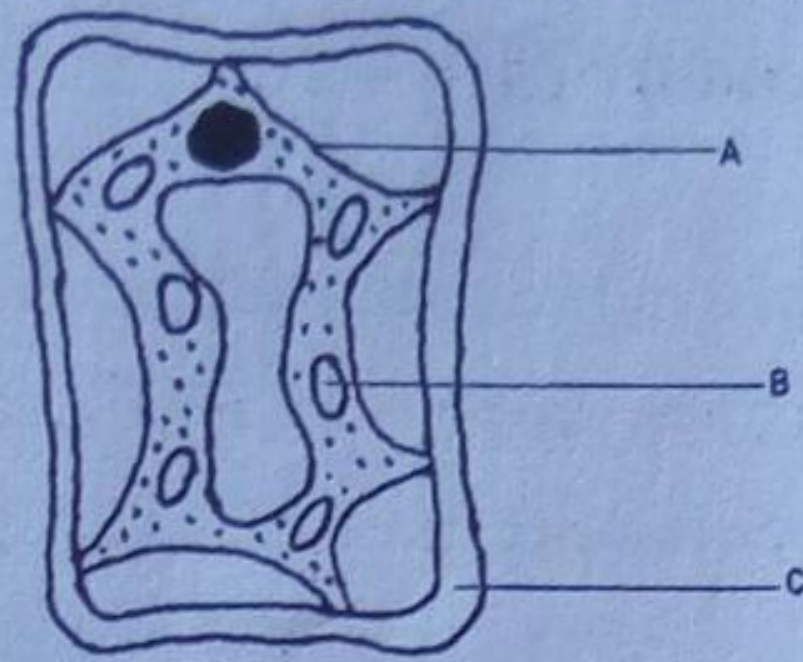
The process leads to contamination or pollution of drinking water from the highly proliferated algae.

(e) Explain the relationship between graphs X and Y.

Ans.

The relationship between the two graphs was that the population of organisms in graph Y was preying (predation) on population of organisms in graph X of the food chain.

4. The diagram shows a plant cell which has been put in a concentrated salt solution.



(a) Identify the parts labeled A and B.

Ans.

A is plasma membrane

B is chloroplast

(b) (i) what happened for the cell to reach this state?

Ans.

There was a loss of water from the cell which resulted into drop in turgor pressure.

(ii) State the term given to the cell in this condition.

Ans.

Plasmolysed cell

(iii) How can this condition be reversed?

Ans.

This condition (plasmolysis) can be reversed when the cells are removed from the hypotonic solution and placed into hypotonic solution where entry of water into the cell by osmosis will take place.

(c) Give one reason why the structure labeled C remained in its natural state.

Ans.

Structure C, the cell wall, remained in its natural state because of its slight elasticity and rigid structure allows the cell not to change its shape even after plasmolysis.

(d) Give two differences between a plant cell and an animal cell.

Ans.

Difference 1. Plant cell have cell wall round the cell membrane while animal cell only have cell membrane.

Difference 2. Some plant cells have chloroplasts which is not present in animal cells.

5. Figure 2.1 shows an experiment to investigate the movement of coloured solution in a plant.

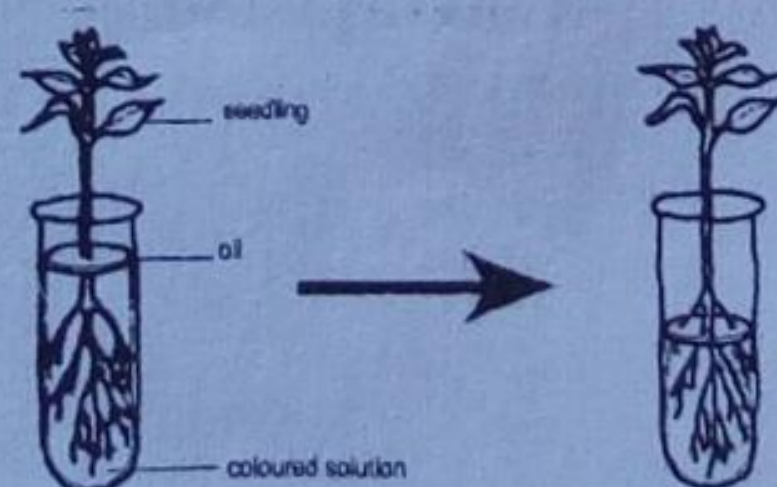


Fig.2.1

- (a) Name the process by which
 (i) Water in the solution was absorbed by the plant.

Ans.

Osmosis

- (ii) Coloured water solute in the solution was absorbed by the plant.

Ans.

Diffusion

- (a) Why was soil put on top of the coloured solution?

Ans.

To prevent evaporation of solution

- (b) Figure 2.2 shows the cross section of the stem abstracted from fig.2.1 at the end of the experiment.

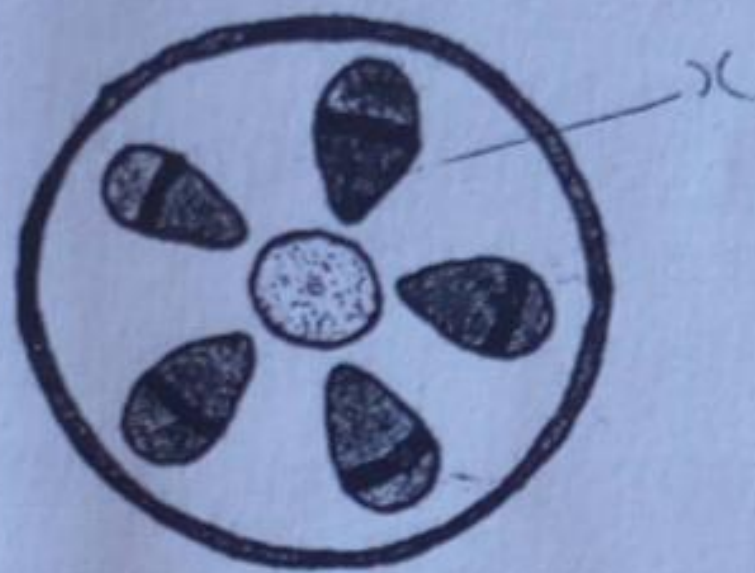


Fig.2.2

- (i) Using X, label the part on the figure which was stained by the dye.

Ans.

- (ii) Identify the part you have labeled X and give one function for each.

Ans.

Name : Xylem tissue

- (iii) Name two substances transported by part X and give one function for each.

Ans.

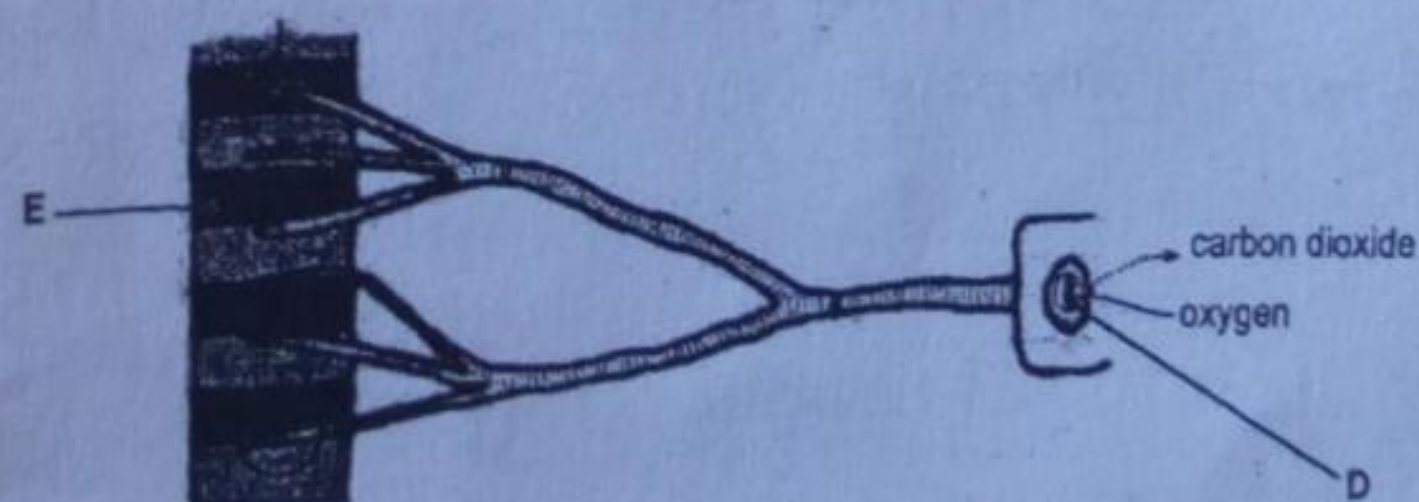
Name: water

Function: photosynthesis

Dissolved minerals

Function: prevention of stunted growth of a plant

6. The diagram shows part of the respiratory system of an insect.



- (a) Identify the parts labeled D and E.

Ans.

Part **D** Spiracle

Part E Respiring cell

(b) Explain how oxygen from the atmosphere is able to reach the tissue labeled E.

Ans.

Oxygen high in concentration in the atmosphere diffuses into the body of the insect passing through D, the spiracle and the trachea until it reaches the tracheoles which lie in the tissue of E.

(c) Explain how the energy released from respiration in an insect is used.

Ans.

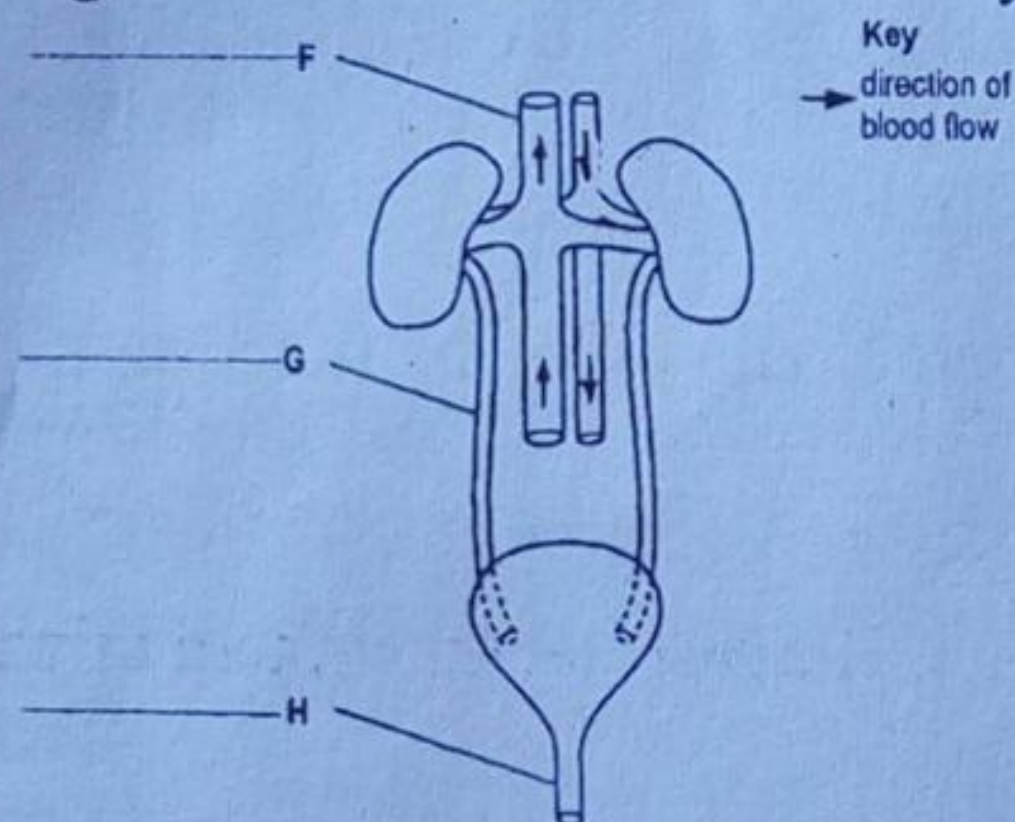
Energy released from respiration in an insect is used to propel it from one place to another in search of food. It is also used to propel it to environments where conditions are suitable for homeostasis to be maintained. The same energy is also used in the reproduction of offspring insects and in metabolic activities such as digestion.

State two ways in which the respiratory system differs from that of a fish.

Ans.

- Unlike insects which obtain oxygen from the atmosphere, fish obtain their oxygen which is dissolved in water.
- Fish do not use spiracles for gaseous exchange during respiration instead they use gills which are located in the gill chamber.

7. The diagram below shows the urinary system and its blood supply.



(a) On the diagram label structures F, G and H.

Ans.

F – Vena cava

G – Ureter

H – Urethra

(b) State two processes that are involved in urine formation.

Ans.

1. Filtration

2. Reabsorption

(c) The table below shows the relative quantities of several substances in the blood in the renal artery and renal vein.

Substance	Relative quantities in blood in the renal artery (arbitrary units)	Relative quantities in blood in renal vein (arbitrary units)
Glucose	10.0	9.5
Oxygen	100.0	40.0
Sodium salts	32.0	27.0
Urea	6.0	2.5
water	180.0	175.0

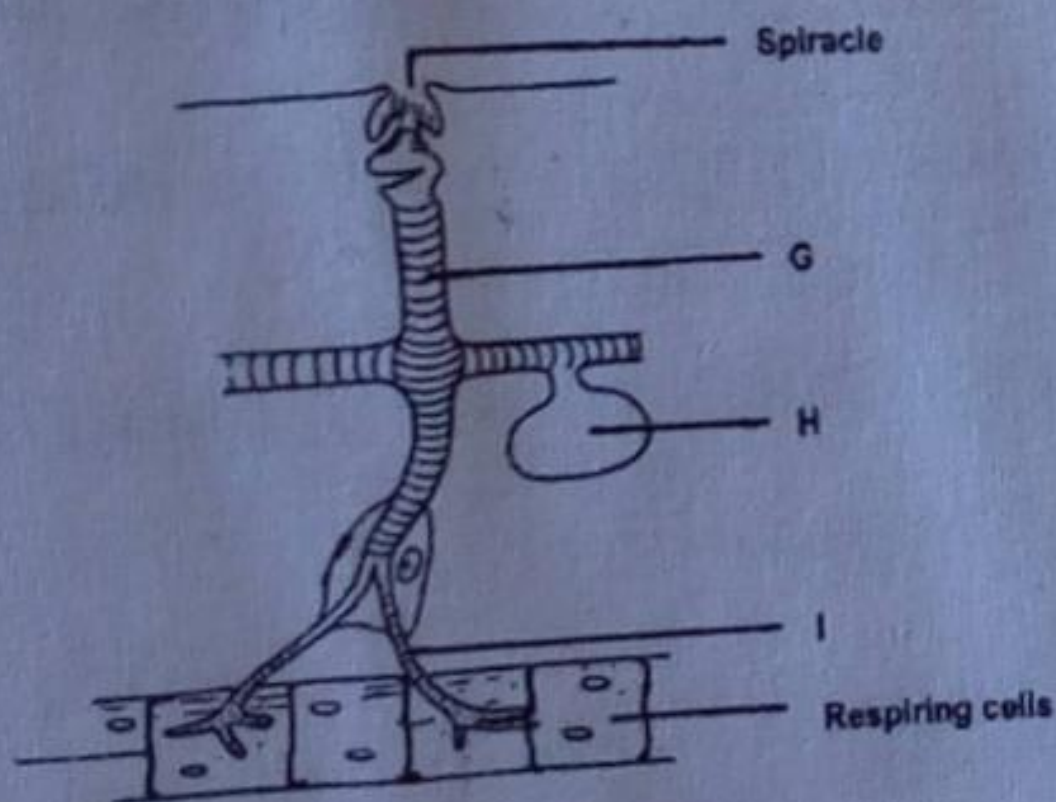
Explain what happens in the kidney to bring about the changes in the relative quantities of urea

Ans.

Urea – which is toxic was filtered by the nephron of the Bowman's capsule in the kidney out of the blood stream.

Glucose – Glucose in blood that entered the kidney on high pressure was reabsorbed into the blood stream

8. The diagram shows part of the respiratory system of an insect.



(a) Which labeled parts G, H and I of the respiratory system of an insect is the

Ans.

(i) Trachea? G

(ii) Air space? H

(b) An insect undergoing strenuous activities needs oxygen at a faster rate for respiration.

Explain how such insect is able to increase its gaseous exchange.

Ans.

It will increase its gaseous exchange by increasing the pumping movements of the abdomen while squeezing air into and out of the tracheal system.

(ii) Describe structural differences between the blood vessels R and S.

Ans.

Arteries are large, thick-walled, muscular and elastic vessels (as they carry oxygenated blood under high pressure away from the heart).

Veins are less muscular, thin and have valves which prevent backflow of blood.

11. Fig.3.1.1 and fig.3.1.2 show the experimental set up to demonstrate a biological process at the start of the experiment.

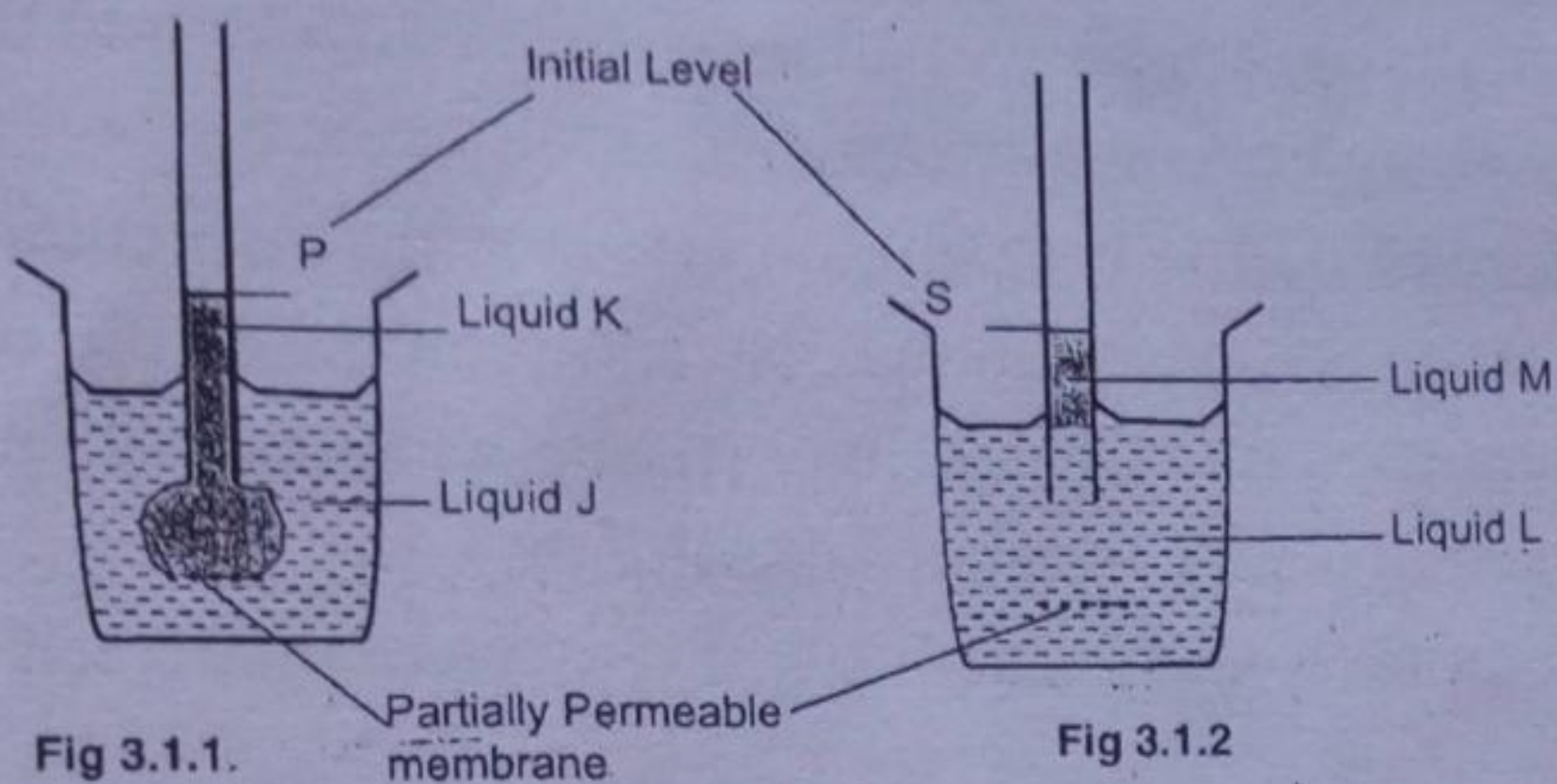
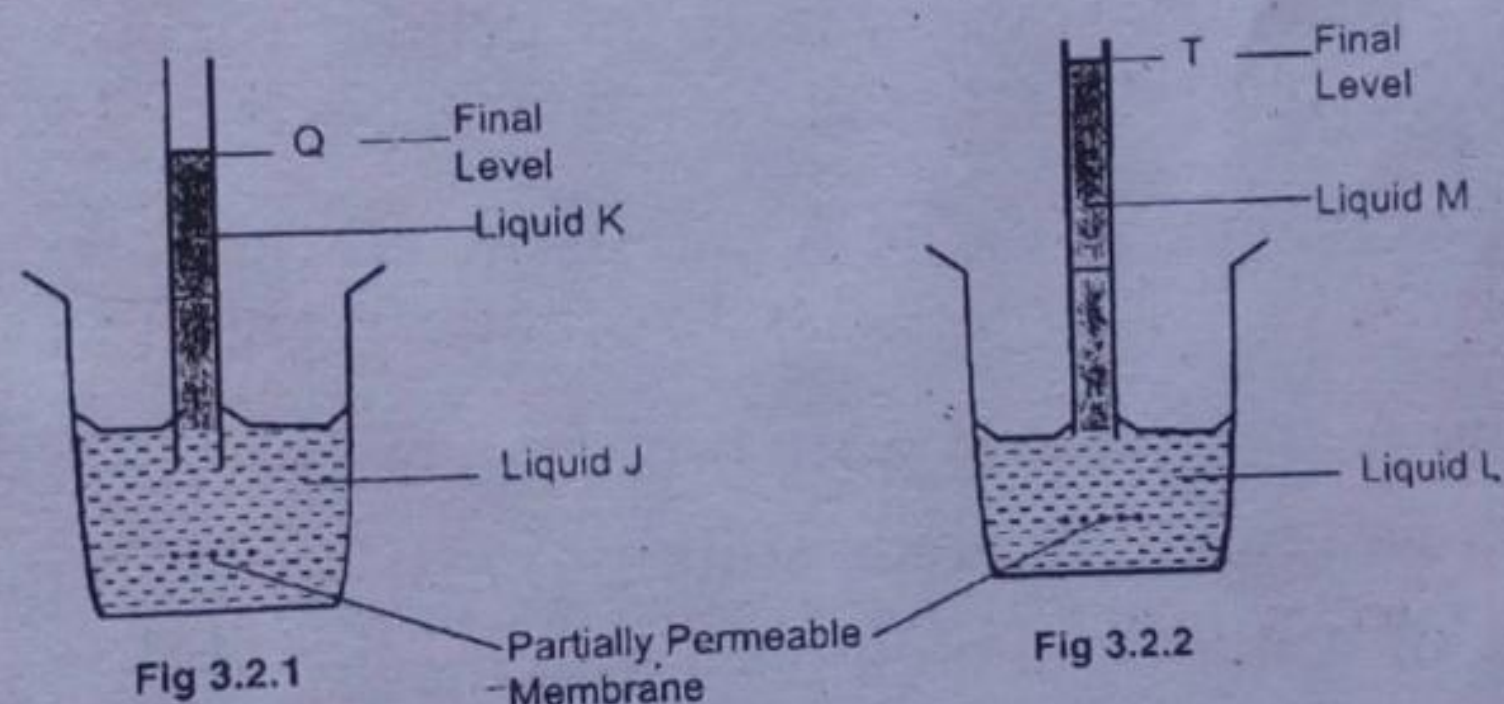


Fig.3.2.1 and fig.3.2.2 show the same experimental set up to demonstrate a biological process after 30 minutes.



(a) Two of the liquids used in the experiment were water and the other two were sucrose solutions.

(i) From the experimental results shown in fig.3.2.1 and fig 3.2.2, name liquids J and L.

Ans.

J - Water

L - water

(ii) Explain why liquid M has risen to a greater height than liquid K.

Ans.

Liquid in M was more concentrated than liquid K hence more water was needed to dilute the concentration which raised the height in liquid M higher than in liquid K.

(b) Name

(i) the biological process being demonstrated in the experimental set up.

Ans.

Osmosis

(ii) how does the process you have named affect an animal cell when placed in water?

Ans.

An animal cell lack cell wall, therefore when placed in water (which is hypotonic when pure) osmosis will allow water to diffuse into the cell causing it to swell and eventually burst.

Note: A hypotonic solution is a solution in which the concentration of the dissolved substance is lower than the concentration inside the cell.

12. In biology experiment, a student used two tissues, liver (tissue A) and unripe pawpaw (tissue B). These were immersed in a concentrated salt solution.

(a) Explain what happened to tissue A and tissue B when they were immersed in the concentrated salt solution,

Ans.

When tissue A and tissue B were immersed in concentrated salt solution, they became limp and soft as the cells lost water from the central vacuoles which resulted into the loss of turgor pressure

(b) Describe how the changes in tissue A and tissue B were brought about.

Ans.

Changes in tissue A and tissue B were brought about when both tissues are in concentrated salt solution (hypotonic solution) lost water to the more concentrated solution. Escape of water from both tissues to the salt solution caused the plasma membrane and cytoplasm to shrivel (shrink) away from the cell wall because of decreased pressure in the tissues.

(c) Define the process involved in (b) above

Ans.

Osmosis is the diffusion of water molecules through a selectively permeable membrane from an area of higher water concentration to an area of lower water concentration.

(d) How is the process important to plants and animals?

Ans.

Osmosis is important to plants and animals to maintain the balance of cells in a dynamic equilibrium as it prevents both lysis and cell crenation in animal cells while maintaining turgor pressure and preventing plasmolysis in plant cells.

It also facilitates the movement of water from the soil to the plant.

13. Explain the following terms using specific examples of drugs.

(a) A stimulant

Ans.

- A stimulant is a drug which increases the activity of the central and sympathetic nervous system.
- Cocaine is a good example of a stimulant drug.
- It stimulates the central nervous system by working on a part of inner brain which governs emotions and basic drives such as hunger and thirsty. It affects the CNS by disrupting the body's circulatory system.
- It initially causes the slowing of the heart rate followed by great increase in the heart rate and narrowing of the blood vessels called vaso constriction which eventually results into high blood pressure.

(i) A depressant

Ans.

A depressant is a drug that lowers or depresses the activity of nervous system.

- Alcohol is a good example of a depressant drug.
- The primary medicinal uses of depressants are to encourage calmness and produce sleep.
- Depressant drugs are commonly known as sedatives.
- A depressant affect the CNS by lowering its activity and dissolving through the membranes of the neurons rather than acting on specific receptors. Once inside the neuron, alcohol disrupts important cellular functions by apparently blocking the movement of sodium and calcium ions that are responsible for transmitting impulses.

(b) Why is it not easy to give up smoking?

Ans.

It is not easy to give up smoking because tobacco contains nicotine, a stimulant substance which leads to addiction. Addiction then makes a person's body to actually develop a chemical need for the drug in order to function normally, therefore, a smoker becomes both psychological and physiological dependant on a drug such that should there be a quit on smoking, withdrawal may occur which might lead to illness.

14. Explain the following terms:

(a) Pathogen

Ans.

This is a disease causing micro-organism such as fungi, bacteria and viruses.

(b) Vector

Ans.

A vector is the organism which help the pathogen get into its host.

(c) Describe ways in which pathogens of the following diseases can enter the body:

(i) Malaria

Ans.

Malaria pathogen (plasmodium) can enter the body through bites by the female (anopheles) mosquito which acts as a vector.

(ii) Gonorrhoea

Ans.

Gonorrhoea pathogen (Gonococcus neiseria) can enter the body through sexual intercourse with an infected person. It can also be passed on to infants born to infected mothers.

Vaccines

Ans.

These are medicines which are used to **prevent** infections.

(iii) Antibiotics or antiviral drugs

Ans.

These are medicines which are used to **cure** infections.

(iv) Cardiovascular drugs

Ans.

These are medicines which are used to **treat** heart and circulatory problems such as high blood pressure.

(v) Analgesics medicines

Ans.

These are medicines which **relieves** or **stops** pain when taken into the body, panado, cafemal and aspirin are all examples of analgesics medicines.

(vi) Nacotics

Ans.

These are drugs which relieves pain but also causes sleep because of their effect on the central nervous system.

15. Define the following terms

(a) Dendrite

Ans.

A dendrite is a branch like extension of a neuron that receives impulses and carry them towards the cell body.

(b) Axon

Ans.

A(n) axon is a single extension of the neuron which carries impulses away from the cell body.

16. Explain the following terms

(a) Drug

Ans.

A drug is a chemical that is capable of reacting with body's functions.

(b) Medicine

Ans.

A medicine is a drug that, when taken into the body, helps prevent, cure or relieve a medical problem.

(c) Drug misuse

Ans.

Drug misuse is the use of medicine in a way for which it was not intended.

(d) Drug abuse

Ans.

Drug abuse is the inappropriate self administering of a drug for non-medical purpose.