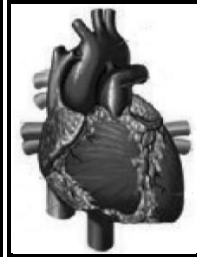


UNIT – 14

TRANSPORTATION IN PLANTS AND CIRCULATION IN ANIMALS



I. Choose the correct answer

- Active transport involves
 - movement of molecules from lower to higher concentration
 - expenditure of energy
 - it is an uphill task
 - all of the above**
- Water which is absorbed by roots is transported to aerial parts of the plant through
 - cortex
 - epidermis
 - Phloem
 - xylem**
- During transpiration there is loss of _____ [AUG – 2022]
 - carbon dioxide
 - oxygen
 - water**
 - none of the above
- Root hairs are _____ [PTA – 4]
 - cortical cell
 - projection of epidermal cell
 - unicellular
 - both b and c**
- Which of the following process requires energy? [PTA – 3]
 - active transport**
 - diffusion
 - osmosis
 - all of them
- The wall of human heart is made of
 - Endocardium
 - Epicardium
 - Myocardium
 - All of the above**
- Which is the correct sequence of blood flow
 - ventricle → atrium → vein → arteries
 - atrium → ventricle → veins → arteries
 - atrium → ventricle → arteries → vein**
 - ventricles → vein → atrium → arteries
- A patient with blood group O was injured in an accident and has blood loss. Which group of blood should be used by doctor for transfusion? [MDL – 19]
 - O group**
 - AB group
 - A or B group
 - all blood group
- 'Heart of heart' is called
 - SA node**
 - AV node
 - Purkinje fibres
 - Bundle of His
- Which one of the following shows correct composition of blood
 - Plasma - Blood + Lymphocyte
 - Serum - Blood + Fibrinogen
 - Lymph - Plasma + RBC + WBC
 - Blood - Plasma + RBC + WBC + Platelets**

II. Fill in the blanks

- Transpiration** involves evaporative loss of water from aerial parts.
- Water enters into the root hair cell through **plasma (or) semi permeable** membrane.
- Parts of the root (or) structures in root that absorbs water from the soil is **root hair**. [PTA – 6]
- Normal blood pressure is **120 mm Hg / 80 mm Hg**.
- The normal human heartbeat rate is about **72 – 75** times per minute.

III. Match the following

Section - I	Column I	Column II	Answer
	1. Symplastic pathway	Leaf	1. Plasmodesmata
	2. Transpiration	Plasmodesmata	2. Leaf
	3. Osmosis	Pressure in xylem	3. Pressure gradient
	4. Root Pressure	Pressure gradient	4. Pressure in xylem

Section - II	Column I	Column II	Answer
	1. Leukemia	Thrombocytes	1. Blood Cancer
	2. Platelets	Phagocyte	2. Thrombocytes
	3. Monocytes	Decrease in leucocytes	3. Phagocyte
	4. Leucopenia	Blood Cancer	4. Decrease in leucocytes
	5. AB blood group	Allergic condition	5. Absence of antibody
	6. O blood group	Inflammation	6. Absence of antigen
	7. Eosinophil	Absence of antigen	7. Allergic condition
	8. Neutrophils	Absence of antibody	8. Inflammation

IV. State whether True or False. If false write the correct statement

- The phloem is responsible for the translocation of food. [True]
- Plants lose water by the process of transpiration. [True]
- The form of sugar transported through the phloem is glucose. [False]
*The form of sugar transported through the phloem is **sucrose**.
- In apoplastic movement the water travels through the cell membrane and enter the cell. [False]
*In **symplastic movement** the water travels through the cell membrane and enter the cell.
- When guard cells lose water the stoma opens. [False]
* When guard cells lose water the stoma **closes**.
- Initiation and stimulation of heart beat take place by nerves. [False]
*Initiation and stimulation of heartbeat take place by **heart muscles(i.e) sino-atrial node**.
- All veins carry deoxygenated blood. [False]
* All veins **except pulmonary vein** carry deoxygenated blood.
- WBC defend the body from bacterial and viral infections. [True]
- The closure of the mitral and tricuspid valves at the start of the ventricular systole produces the first sound 'LUBB'. [True]

V. Answer in a word or sentence

- Name two layered protective covering of human heart. Pericardium.
- What is the shape of RBC in human blood? Biconcave and disc shaped.
- Why is the colour of the blood red? [AUG – 2022] Due to respiratory pigment haemoglobin.
- Which kind of cells are found in the lymph? WBC especially Lymphocytes.
- Name the heart valve associated with the major arteries leaving the ventricles. Semilunar valves.
- Mention the artery, which supplies blood to the heart muscle. Coronary arteries.

VI. Short answer questions

1. What causes the opening and closing of guard cells of stomata during transpiration?

Change in turgidity of guard cells causes opening and closing of stomata.

2. What is cohesion?

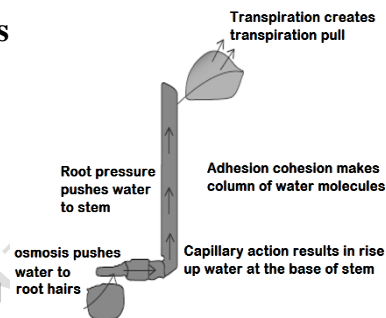
The force of attraction between water molecules is called cohesion.

[PTA – 1]

3. Trace the pathway followed by water molecules from the time it enters a plant root to the time it escapes into the atmosphere from a leaf.

- ❖ Root hair absorbs water by osmosis.
- ❖ Root pressure conducts water to stem through xylem.
- ❖ Stem conducts water to leaf.
- ❖ Excess water is evaporated through stomata by transpiration.

Root hair → Root → Stem → Leaf → Stomata → Water is evaporated



4. What would happen to leaves of a plant that transpires more water than its absorption in roots?

- ❖ Plant dehydrates and loses moisture resulting in wilting or drying of leaves.
- ❖ It affects plant growth, photosynthesis and may lead to death.

5. Describe the structure and working of the human heart.

Heart is a muscular pumping organ that pumps blood into blood vessels.

Structure:

- ❖ Heart is enclosed by pericardium.
- ❖ It is four chambered and is situated between lungs.
 - Auricle - Two upper thin walled chambers
 - Ventricle - Two lower thick walled chambers
- ❖ These chambers are separated by septum.

Working of human heart :

- ❖ Right atrium receives deoxygenated blood from body parts through main veins.
- ❖ Left atrium receives oxygenated blood from lungs through pulmonary veins.
- ❖ Right and left auricles pump blood into right and left ventricles respectively.
- ❖ Right ventricle supplies deoxygenated blood to lungs by pulmonary arteries.
- ❖ Left ventricle supplies oxygenated blood to body parts by aorta.
- ❖ Coronary arteries supply blood to heart.

6. Why is the circulation in man referred to as double circulation?

[PTA – 1]

In man, blood circulates twice through heart in one complete cycle. So, it is called double circulation.

7. What are heart sounds? How are they produced?

- ❖ Rhythmic closure and opening of heart valves is called heart sounds.
- ❖ LUBB sound is produced by closure of tricuspid & bicuspid valves.
- ❖ DUPP sound is produced by closure of semilunar valves.

8. What is the importance of valves in the heart?

[MAY - 2022, PTA – 2]

- ❖ Valves regulate blood flow in single direction.
- ❖ It prevents backward flow of blood into ventricles.

9. Who discovered Rh factor? Why was it named so?

[PTA – 6]

- ❖ Landsteiner and Wiener discovered Rh factor.
- ❖ It was discovered in the blood of **R**hesus monkey. So, it was named as Rh factor.

10. How are arteries and veins structurally different from one another?

[PTA – 5]

S.No	Artery	Vein
1.	It have a strong, thick and elastic wall.	It have a weak, thin and non-elastic wall.
2.	Internal valves are absent.	Internal valves are present.
3.	Deep in location	Superficial in location

11. Why the sinoatrial node is called as the pacemaker of heart?

[MDL – 19, PTA – 5]

Sinoatrial node initiates an impulse, which simulates heart muscles to contract. SA node plays an important role in the initiation of heartbeat. Hence, it is called as pacemaker of heart.

12. Differentiate between systemic circulation and pulmonary circulation.

[PTA – 2]

Systemic circulation	Pulmonary circulation
1. Oxygenated blood is pumped from heart to body.	1. Deoxygenated blood is pumped from heart to lungs.
2. Deoxygenated blood is returned to heart.	2. Oxygenated blood is returned to heart.
3. Occurs between heart and body via arteries and veins.	3. Occurs between heart and lungs via pulmonary arteries and pulmonary veins.

13. The complete events of cardiac cycle last for 0.8 sec. What is the timing for each event?

Each Event of cardiac cycle involves:

***Atrial systole:** 0.1 sec ***Ventricular systole:** 0.3 seconds ***Ventricular diastole:** 0.4 seconds

VII. Give reasons for the following statements

1. Minerals cannot be passively absorbed by the roots.

- ❖ Minerals in soil are ions. It cannot move across cell membrane.
- ❖ Concentration of minerals in soil is lower than the concentration of minerals in root.
- ❖ Thus, minerals cannot be passively absorbed by roots.

2. Guard cells are responsible for opening and closing of stomata.

[SEP – 2021]

- ❖ Change in turgidity of guard cells causes opening and closing of stomata.
- ❖ When water enters, guard cells become turgid and stoma open.
- ❖ When guard cells lose water, it shrinks and stoma closes.

3. The movement of substances in the phloem can be in any (or) all direction.

[PTA – 4]

- ❖ Function of Phloem is to transport food from source to sink.
- ❖ Normally, Phloem transports food in downward direction (i.e) from leaves to root, stem etc.,
- ❖ Based on plant's need, Phloem transports in upward direction from root to all parts.
- ❖ Thus, movement of substances in phloem can be in any direction.

4. Minerals in the plants are not lost when the leaf falls.

[PTA – 2]

Reason: Minerals are remobilised from older dying leaves to younger leaves.

So, minerals in plants are not lost, when leaf falls.

5. The walls of the right ventricle are thicker than the right auricle.

Reason: Right ventricle have to pump out blood with force away from heart.

Thus, the walls of ventricles are thicker than auricles.

6. Mature RBC in mammals do not have cell organelles.

[PTA – 4]

Reasons:

- ❖ Lack of nucleus makes the cells biconcave and increases the surface area for oxygen binding.
- ❖ Lack of mitochondria allows RBC to transport all the oxygen to tissues.
- ❖ Lack of endoplasmic reticulum gives flexibility for RBC to move through narrow capillaries.

VIII. Long answer questions

1. How do plants absorb water? Explain.

Water absorbing unit - Root Hair:

- ❖ Root hairs absorb water and minerals by diffusion.
- ❖ They are thin walled, extension of epidermal cell that increase the area of absorption.

Pathway of Water absorbed by Roots:

- ❖ Water enters root hairs, concentration of water in root hairs become more than in cortex.
- ❖ Thus, water from root hair move to cortical cells by osmosis and reaches xylem.
- ❖ Then water is transported to stem and leaves.

Types of movement of water into root cells:

1. Apoplast pathway

- ❖ Movement of water is through the intercellular spaces and the cell walls.
- ❖ It is dependent on the gradient.

2. Symplast pathway

- ❖ Movement of water is through plasma membrane, cytoplasm and plasmodesmata.
- ❖ It is dependent on concentration gradient. It is slower.

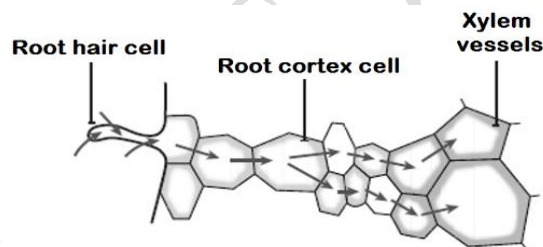
2. What is transpiration? Give the importance of transpiration.

[AUG – 2022]

Transpiration: It is the evaporation of water from aerial plant-parts through stomata in leaves.

Importance of transpiration:

- ❖ It creates transpiration pull.
- ❖ It supplies water for photosynthesis.
- ❖ It transports minerals from soil.
- ❖ It cools the leaf surface.
- ❖ It keeps the cells turgid, hence maintain their shape.



3. Why are leucocytes classified as granulocytes and agranulocytes? Name each cell and mention its functions.

* Leucocytes are classified as granulocytes and agranulocytes because of its presence and absence of granules in it respectively.

1) Granulocytes: They contain granules in cytoplasm. Its nucleus is irregular (or) lobed.

<i>i) Neutrophils</i>	They increase during infection and inflammation.
<i>ii) Eosinophils</i>	<ul style="list-style-type: none"> • They increase during allergy & parasitic infections. • It brings detoxification of toxins.
<i>iii) Basophils</i>	They release chemicals during inflammation.

2) Agranulocytes: Granules are not found in cytoplasm. Its nucleus is not lobed.

<i>i) Lymphocytes</i>	They produce antibodies during bacterial and viral infections.
<i>ii) Monocytes</i>	They are phagocytic and can engulf bacteria.

4. Differentiate between systole and diastole. Explain the conduction of heart beat.

Systole	Diastole
1. Contraction of auricles & ventricles of heart.	1. Relaxation of auricles & ventricles of heart.
2. Normal systolic pressure is 120mm.	2. Normal diastolic pressure is 80mm.

Conduction of heart beat:

- ❖ Sino – atrial node acts as the pacemaker of heart.
- ❖ SA node initiates an impulse. It stimulates the heart muscles to contract.
- ❖ This impulse spreads as a wave of contraction over right and left atrial wall
- ❖ Thus, pushing blood through atrioventricular valves into ventricles.
- ❖ SA node initiates wave of contraction. It reaches atrioventricular (AV) node.
- ❖ AV node emits an impulse of contraction
- ❖ It spread to ventricular muscles via atrioventricular bundle and Purkinje fibres.

5. Enumerate the functions of blood.

[SEP-21] [AUG – 2022]

- ❖ It transports respiratory gases (O₂ & CO₂).
- ❖ It transports digested food to body parts.
- ❖ It transports hormones and excretory products like ammonia, urea, uric acid.
- ❖ It protects body & defense against diseases.
- ❖ It acts as buffer and helps in regulation of pH and body temperature.
- ❖ It maintains water balance.

IX. Assertion and Reasoning

Direction: In each of the following questions, a statement of assertion (A) is given and a corresponding statement of reason (R) is given just below it. Mark the correct statement as.

- If both A and R are true and R is correct explanation of A.
- If both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- Both A and R are false.

1. **Assertion (A):** RBC plays an important role in the transport of respiratory gases.

Reason (R) : RBC do not have cell organelles and nucleus.

Ans. (a) *Both A and R are true and R is correct explanation of A.*

2. **Assertion (A) :** Persons with AB blood group are called an universal recipients, because they can receive blood from all groups.

Reason (R) : Antibodies are absent in persons with AB blood group.

Ans. (a) *Both A and R are true and R is correct explanation of A.*

X. Higher Order Thinking Skills (HOTS)

1. **When any dry plant material is kept in water, they swell up. Name and define the phenomenon involved in this change.**

- ❖ *Phenomenon* is Imbibition.
- ❖ *Definition:* It is a type of diffusion in which a solid absorbs water and gets swelled up.
- ❖ *Ex:* Absorption of water by seeds and dry grapes.

2. **Why are the walls of the left ventricle thicker than the other chambers of the heart?**

Left ventricle pumps blood with great pressure into aorta, to the whole body. Whereas the other chambers pump the blood with comparatively lesser pressure. Thus it is thicker.

3. **Doctors use stethoscope to hear the sound of the heart. Why?**

Stethoscope is a diagnostic tool to identify and localize health problems and diagnose disease.

4. **How does the pulmonary artery and pulmonary vein differ in their function when compared to a normal artery and vein?**

- ❖ All arteries carry oxygenated blood except pulmonary arteries, which carry deoxygenated blood.
- ❖ All veins carry deoxygenated blood except pulmonary veins, which carry oxygenated blood.

5. **Transpiration is a necessary evil in plants. Explain.**

[PTA – 3]

- ❖ During transpiration 95% of water is evaporated. It is an inevitable process.
- ❖ Therefore, it is a necessary evil in plants.