

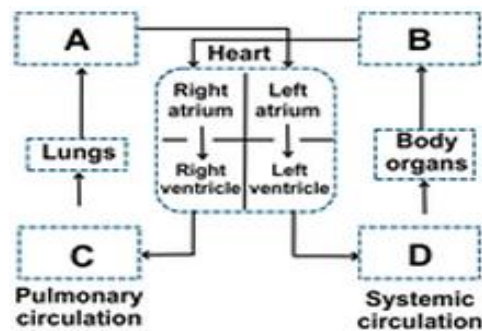


INDIAN SCHOOL AL WADI AL KABIR

Class: X	DEPARTMENT OF SCIENCE -2025-26	DATE: 26/05/2025
	SUBJECT: BIOLOGY	
WORKSHEET NO:2	TOPIC: LIFE PROCESSES (TRANSPORTATION)	A4 FILE FORMAT (PORTFOLIO)
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

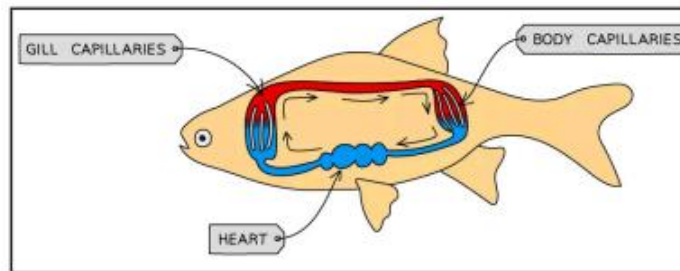
I. a) OBJECTIVE TYPE QUESTIONS:

- Some desert plants, such as cacti, store water in their stems as a survival strategy. How does this water storage relate to the excretion process in these plants, and what might be the significance of water storage for their survival in arid environments?
 - Water storage inhibits excretion; it helps maintain turgidity during water scarcity.
 - Water storage inhibits excretion; it conserves water during periods of drought.
 - Water storage is unrelated to excretion; it serves as a means of defence against herbivores.
 - Water storage promotes transpiration; it enhances nutrient absorption.
- Accurately identify the blood vessels A, B, C and D to complete the flowchart depicting double circulation in humans.



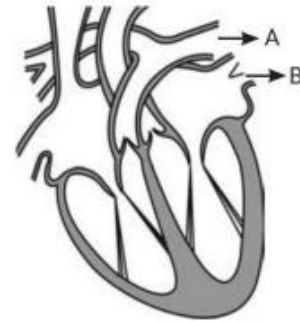
- A: Pulmonary Vein, B: Pulmonary Artery, C: Aorta, D: Superior and Inferior Venacava
 - A: Aorta, B: Superior and Inferior Venacava, C: Pulmonary Artery, D: Pulmonary Vein
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 - A: Superior and Inferior Venacava, B: Pulmonary Vein, C: Pulmonary Artery, D: Aorta
- In a study conducted on two different tree species, Species A and Species B, it was found that Species A had wider xylem vessels compared to Species B. How might this anatomical difference impact the ascent of sap in these species?

- a) Species A likely has a slower ascent of sap due to wider vessels.
 - b) Species A likely has a faster ascent of sap due to wider vessels.
 - c) Species B likely has a faster ascent of sap due to narrow vessels.
 - d) The thickness of xylem vessels is unrelated to the ascent of sap.
4. You are a physician conducting a routine checkup on a patient. During the examination, you notice that the sphygmomanometer shows a reading of 160/90 mm Hg. What do these values represent, and should you be concerned about this reading?
- a) The values represent systolic and diastolic pressures, and the patient has normal blood pressure.
 - b) The values represent systolic and diastolic pressures, and the patient has hypertension (high blood pressure).
 - c) The values represent heart rate and are not related to blood pressure.
 - d) The values represent arterial oxygen levels, and the patient has low blood oxygen.
5. In the context of the lymphatic system, how does the removal of waste products from tissues relate to the overall function of the system?
- a) The lymphatic system removes waste products by excreting them through the skin.
 - b) Waste products accumulate in lymph nodes, improving immune function.
 - c) Lymphatic vessels transport waste products to the liver for detoxification.
 - d) The lymphatic system helps remove cellular debris and waste, such as dead cells and tissue fluids.
6. The image shows the circulation of blood in fishes. Which option correctly traces the pathway of blood flow in fish body?



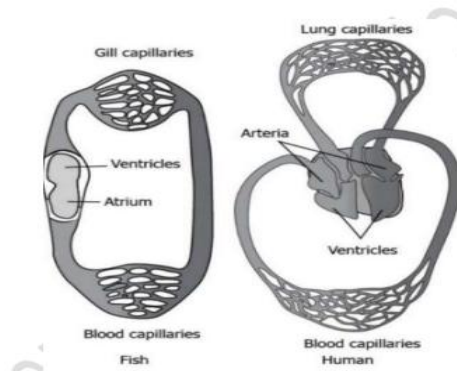
- a) Gill capillaries → oxygenated blood → heart → body cells → deoxygenated blood → gills
 - b) Gill capillaries → oxygenated blood → body cells → deoxygenated blood → heart → gills
 - c) Capillaries → heart → oxygenated blood → body cells → deoxygenated blood → heart → gills
 - d) Gill capillaries → oxygenated blood → heart → body cells → deoxygenated blood → heart → gills
7. Four chambered heart
- a) Prevents mixing of oxygenated and deoxygenated blood
 - b) Allows mixing of oxygenated and deoxygenated blood
 - c) Is found in cold blooded animals
 - d) None of the above

8. The process in which loss of water in the form of vapours from the aerial parts of plants takes place is *X*, which helps in *Y*. Here, *X* and *Y* respectively are
- transpiration and photosynthesis
 - transpiration and temperature regulation
 - translocation and movement of soluble products of photosynthesis in phloem
 - translocation and absorption of water and minerals from soil by roots.
9. Consider the following statements in connection with the functions of the blood vessels marked A and B in the diagram of a human heart as shown.
- Blood vessel A - It carries carbon dioxide rich blood to the lungs.
 - Blood vessel B - It carries oxygen rich blood from the lungs.
 - Blood vessel B - Left atrium relaxes as it receives blood from this blood vessel.
 - Blood vessel A - Right atrium has thick muscular wall as it must pump blood to this blood vessel.



The correct statements are:

- (i) and (ii) only
 - (ii) and (iii) only
 - (ii), (iii) and (iv)
 - (i), (ii) and (iii)
10. The correct pathway of blood in the circulatory system is
- Ventricles → atria → veins → arteries.
 - Atria → veins → arteries → ventricles.
 - Atria → ventricles → arteries → veins.
 - ventricles → veins → arteries → atria
11. The image shows the circulation of blood in fish and humans.



How is the circulation of blood in fish different from that in humans?

- The flow of blood in fish is unidirectional.
- The heart of fish has more chambers compared to that of a human.

- c) The blood goes through heart only once in fishes.
 - d) The heart in fish is bigger in size.
12. _____ ensure that blood does not flow backward when the atria or ventricles contract.
- a) Arteries
 - b) Veins
 - c) Valves
 - d) Capillaries

I. B) ASSERTION AND REASONING:

For the following questions, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii), and (iv) as given below.

- i) *Both A and R are true and R is the correct explanation of the assertion.*
- ii) *Both A and R are true but R is not the correct explanation of the assertion.*
- iii) *A is true but R is false.*
- iv) *A is false but R is true*

14. **Assertion:** Arteries are thick walled and elastic in nature.

Reason: Arteries must transport blood away from the heart with pressure.

15. **Assertion:** Plants have low energy needs.

Reason: Plant bodies have a large proportion of dead cells.

16. **Assertion:** Valves are present in the arteries.

Reason: Arteries carry oxygenated blood from the heart to different body parts except pulmonary artery.

17. **Assertion (A):** Human heart is four-chambered.

Reason (R): Vena cava is the only artery that supplies deoxygenated blood to the heart.

II. VERY SHORT QUESTIONS (2M):

- 18. Why do ventricles have thicker, muscular walls than atria?
 - 19. What is the fluid part of the blood called? Which blood cell is responsible for clotting blood?
 - 20. Why do veins have valves?
 - 21. What are capillaries? State the function performed by them.
 - 22. What happens when there is a leak in the blood vessel? How is this issue solved by the body?
- [Or] what is the role of blood platelets?

III. SHORT ANSWER TYPE QUESTIONS (3M):

- 23. Name the three components of the circulatory system?
- 24. Give reasons for the following. (a) Arteries are thick walled. (b) Blood goes only once through the heart in fishes (c) Plants have low energy needs.
- 25. a) "Transport of food in plants requires living tissues and energy". Justify this statement.
b) Name the components of food that are transported by living tissues.

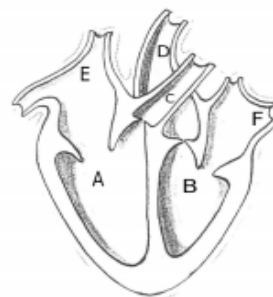
26. Differentiate between the process of transport of water and minerals and food in xylem and phloem.
27. Differentiate between the blood vessels arteries and Veins.
28. Define transpiration. What is its advantage in plants ?

IV. LONG ANSWER TYPE QUESTIONS (5M):

29. a) Draw a sectional view of the human heart and label on it – Aorta, Right ventricle, and Pulmonary veins.
b) State the functions of the following components of transport system:
i) Blood
ii) Lymph
30. i) What is double circulation? Describe double circulation with the help of a diagram.
ii) Why is the separation of the right side and the left side of the heart useful? How does it help birds and mammals?
31. a) Plants absorb water from the soil. Explain how it is taken up and transported from the soil.
b) Explain giving any three reasons the significance of transpiration in plants.
32. a) Explain in detail the transportation of water and minerals in plants?
b) Why is translocation of food in phloem called as active transport?

V. BOARD BASED QUESTIONS.

33. i) Identify any two parts from the diagram given which carry oxygenated and deoxygenated blood.
ii) Explain the process of double circulation with the help of a flow chart.



34. What Process in Plant is known as Transpiration?
35. What would be the consequences of deficiency of haemoglobin in your body?
36. Besides minimizing the loss of blood why is it essential to plug any leak in the blood vessel? Name the component of the blood which helps in this process and state how this component performed this function.
37. The transport system in plants is relatively slower than in animals. Give reasons
38. State the role of phloem in the transport of material in plants

VI. CASE-BASED/SOURCE BASED QUESTIONS.

Read the given passages carefully answer the questions:

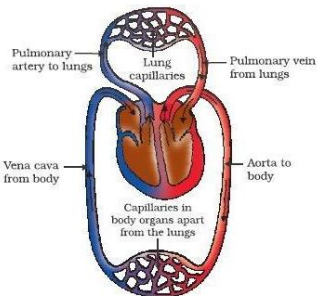
- i) The heart is a muscular organ which is as big as our fist. Because both oxygen and carbon dioxide must be transported by the blood, the heart has different chambers to prevent the oxygen-rich blood from mixing with the blood containing carbon dioxide. The carbon dioxide-rich blood has to reach the lungs for the carbon dioxide to be removed, and the oxygenated blood from the lungs has to be brought back to the heart. This oxygen-rich blood is then pumped to the rest of the body.
a) How many chambers are present in the heart of mammals and reptiles?
b) What do you mean by the term double circulation?

- c) If diffusion were to move oxygen in our body, it is estimated that it would take three years for a molecule of oxygen to reach our toes from our lungs. How do transport of oxygen and carbon dioxide take place in human?
- ii) Plant transport systems will move energy stores from leaves and raw materials from roots. These two pathways are constructed as independently organised conducting tubes. One, the xylem moves water and minerals obtained from the soil. The other, phloem transports products of photosynthesis from the leaves where they are synthesised to other parts of the plant.
- What are the different parts of xylem?
 - What do you mean by the term transpiration?
 - What are the advantages of transpiration?

ANSWERS (HINTS)

1.	b) Water storage inhibits excretion; it conserves water during periods of drought.
2.	c). A: Pulmonary Vein, B: Superior and Inferior Venacava, C: Pulmonary Artery, D: Aorta
3.	b. Species A likely has a faster ascent of sap due to wider vessels.
4.	b. The values represent systolic and diastolic pressures, and the patient has hypertension (high blood pressure).
5.	d. The lymphatic system helps remove cellular debris and waste, such as dead cells and tissue fluids.
6.	(b) Gill capillaries → oxygenated blood → body cells → deoxygenated blood → heart → gills
7.	a. Prevents mixing of oxygenated and deoxygenated blood
8.	b) transpiration and temperature regulation
9.	a) (i) and (ii) only
10.	c) atria → ventricles → arteries → veins
11.	c) The blood goes through heart only once in fishes.
12.	c) Valves
<u>ASSERTION AND REASONING:</u>	
13.	a) Both A and R are true and R is the correct explanation of the assertion.
14.	a) Both A and R are true and R is the correct explanation of the assertion.
15.	d) A is false but R is true.
16.	c) A is true but R is false.
<u>II. SHORT ANSWER TYPE I</u>	
17.	Since ventricles have to pump blood into various organs, they have thicker muscular walls than atria do.
18.	Plasma, platelets
19.	To prevent back flow of blood
20.	Smallest vessels/ which have one cell thick wall. They exchange of material between the blood and the surroundings.
21.	If there is leak in the blood vessels, that may lead to →

	1. Bleeding- the loss of blood from the system 2. Loss of pressure which would reduce the efficiency of the pumping system. To avoid this, the blood has platelet cells which circulate around the body and plug these leaks by helping to clot the blood at these points of injury
	<u>III. SHORT ANSWER TYPE II</u>
22.	The human circulatory system consists of blood, heart and blood vessels, (explanation of each)
23.	(a) To withstand high pressure of the blood (emerging from the heart). (b) Because they do not maintain their own body temperature, therefore, they do not require separation of oxygenated and deoxygenated blood (which allows efficient supply of oxygen)/they have low energy needs. (c) Because plant bodies have a large proportion of dead cells (in many tissues)
24.	(a) Food is transported by sieve tubes through energy food moves into sieve tube at the expense of ATP. Due to increase in osmotic pressure, water enters into the tissues. Due to this pressure material moves from phloem to tissue. (b) Components are: (i) Photosynthetic products or sucrose. (ii) Amino acids
25.	Xylem transport – transport of water and minerals, unidirectional and passive Phloem transport – transport of food, bidirectional and active
26.	Arteries – thick walled, no valves, carry blood from heart, blood flows under high pressure Veins – thin walled, valves are present, carry blood to heart and blood flows under low pressure
28.	The loss of water in the form of vapour from the aerial parts of the plant is known as transpiration Advantages: - 1. Transpiration from the cells of a leaf creates a suction which helps in the absorption and upward movement of water and minerals through xylem from roots to the leaves. 2. It also helps in temperature regulation
	<u>IV. LONG ANSWER TYPE</u>
27.	Heart -Figure-6.10, page- 106 i) Blood • Transport of oxygen to the tissues for the breakdown of digested food and carbon dioxide to the lungs by the blood plasma. • Transport of digested and absorbed nutrients to the tissues and nitrogenous wastes are transported to the kidneys. • It regulates the body temperature and maintains the pH of the body tissues. • It maintains water balance to constant level. • It helps in rapid healing of wounds by forming a clot at the site of injury. ii) Lymph • It cleans the cellular environment. • It returns proteins and tissue fluids to the blood. • It provides a pathway for the absorption of fats and fat-soluble vitamins into the bloodstream.

	• It defends the body against disease.
28.	a) Double circulation–As blood passes twice through heart in a single circulation, the circulation is called double circulation. Right auricle receives deoxygenated blood from various body parts through major veins. At the same time pulmonary vein brings oxygenated blood to left atrium. During this event auricles and ventricles both remain in relaxed state. Some blood passes to the respective ventricles since the auriculo-ventricular valves between auricle and ventricle are open. Once the auricles are full with blood they contract and the blood passes into left and right ventricles. Now the valve between auricle and ventricle closes and ventricles contract to pump blood. Deoxygenated blood present in right ventricle goes to lungs through pulmonary artery and oxygenated blood is distributed to all parts of the body through the largest artery called aorta. From various parts of body deoxygenated blood again returns to right auricle and oxygenated blood from lungs to left auricle.  b) Because unlike fishes, birds and mammals are warm blooded. They have high-energy needs; this separation allows a highly efficient supply of oxygen to release energy continuously.
29.	a) The plants absorb water from the soil with the help of root hair through osmosis. The diffusion of water molecules through a semi-permeable membrane is called osmosis. Root hair absorbs water from soil through osmosis. Water will be absorbed by root hairs by osmosis as the environment in the soil is hypotonic. b) Significance of transpiration in plants: 1. It conducts water and mineral salts to different parts of the plant body. 2. It maintains the osmosis and turgidity of the cells. 3. It helps in the upward movement of water. 4. During transpiration hydrophilic salts get collected on the surface of the leaves, keeping the leaves moist. 5. Optimum transpiration is good for the proper growth of plants. 6. It gives a cooling effect.
30.	a) Water and minerals are transported in plants with the help of xylem tissue. Roots absorb the water from the soil by actively taking up ions, creating the difference in the concentration of these ions between the root and the soil. Water enters the root cells. Movement of water and minerals is due to root pressure (root absorbs water and exerts a pressure which pushes the water upwards) The water moves up creating a column of water that is steadily pushed upwards in vessels and tracheid of the roots, stem, and leaves, and are interconnected to form a continuous system of water-

	conducting channels reaching all parts of the plant. The water loss by leaves through stomata is called transpiration. It creates a suction pressure or transpiration pull, which pulls water from the xylem cells of roots. b) Translocation of food is called an active process because it requires energy to push the food from the cells in the leaves to the sieve tube. The source of this energy is ATP. On the other hand, transportation of water and minerals is a passive process which takes place with the help of physical processes.
31.	i) Oxygenated: B/D/F [B= left ventricle/D=aorta/F=left auricle/pulmonary vein] Deoxygenated: A/C/E [A= right ventricle/C= pulmonary artery/E=right auricle/vena cava] (any two) ii) The oxygenated blood from the lungs returns to the heart, which is pumped again into different parts of the body by the heart. Thus, the blood passes twice through the heart making one complete round through the body. This is called double circulation. Flow chart – double circulation
32.	The loss of water in the form of water vapour from the aerial parts of the plants is called transpiration.
33.	The deficiency of hemoglobin in our body is called anemia. In anemia, the blood is unable to carry enough oxygen required by the body. So, respiration would be less and less energy will be available to the body. The hemoglobin deficient person will feel weak, pale, lethargic and will be unable to perform heavy physical work.
	<u>V. CASE-BASED/SOURCE BASED QUESTIONS.</u> i) a) Mammals- 4 chamber heart and reptiles- 3 chambered heart b) Blood goes through the heart twice during each cycle known as double circulation. c) Blood contains respiratory pigment hemoglobin which has high affinity for oxygen. Oxygen binds with hemoglobin and is then carried to various body parts through blood circulation. In the tissue region oxygen diffuses from blood to the tissue. Carbon dioxide is more soluble in water than oxygen is and hence is mostly transported in the dissolved form in our blood. ii) - vessels, Tracheids, xylem parenchyma and fibres. - The loss of water in the form of vapour from the aerial parts of the plant. i) help in the absorption and the upward movement of water ii) temperature regulation

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