Chapter: 09

Transport

Objective

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1. Most of the transpiration occurs through:

Ⓐ Cuticle Ⓑ Lenticels Ⓒ Mesophyll **Ⓓ Stomata**

2. Stomata cover the leaf surface only:

Ⓐ 3 - 4% Ⓑ 1-3% **Ⓒ 1-2%** Ⓓ 2-3%

3. Outside the conducting tissues there is a narrow layer of thin walled cells, which is called:

Ⓐ Phloem Ⓑ Xylem **Ⓒ Pericycle** Ⓓ Endodermis

4. Guard cells belong to:

Ⓐ Stomata Ⓑ Cortex Ⓒ Endodermis Ⓓ Pericycle

5. What is called the layer of cutting in plants?

Ⓐ Cortex Ⓑ Root Hairs Ⓒ Epidermis **Ⓓ Cuticle**

6. Stomata close when Guard Cells:

Ⓐ Gain Potassium Ions **Ⓑ Lose Water** Ⓒ Become Turgid Ⓓ Gain Chloride ions

7. Regulate the opening and closing of stoma:

Ⓐ phosphorus Ⓑ sulphur **Ⓒ potassium** Ⓓ calcium

8. Force that is responsible for the conduction of water and salts from soil by the roots is called:

Ⓐ Respiration **Ⓑ Transpiration Pull** Ⓒ Osmosis Ⓓ Diffusion

9. Rate of transpiration decreases by the increase of:

Ⓐ air humidity Ⓑ leaf surface area Ⓒ air movement Ⓓ temperature

10. Transpiration rate does not depend upon:

Ⓐ CO_2 Ⓑ Air movement Ⓒ Temperature Ⓓ Leaf diameter

11. The temperature range at which transpiration stops and stomata are closed:

Ⓐ 10 °C– 20 °C Ⓑ 20 °C– 40 °C Ⓒ 20 °C– 45 °C **Ⓓ 40 °C– 45 °C**

12. Transpiration takes place through:

Ⓐ Cuticle Ⓑ Lenticels **Ⓒ All of these** Ⓓ Stomata

13. Evaporation of water from the surface of plant is called:

Ⓐ transportation **Ⓑ transpiration** Ⓒ translocation Ⓓ guttation

14. The stomata open when guard cells:

Ⓐ Become turgid Ⓑ Loose water Ⓒ Gain chloride ions Ⓓ Become Flaccid

15. The transpiration is regulated by:

Ⓐ 0.12 D Ⓑ 0.95 D Ⓒ 1.61 D **Ⓓ 1.85 D**

16. In phloem, transport of food is:

Ⓐ One way Ⓑ Four way Ⓒ Three way **Ⓓ Two way**

17. In most plants food is transported in the form of:

Ⓐ Proteins Ⓑ Starch **Ⓒ Sucrose** Ⓓ Glucose

18. Water enters into Root Hairs by means of:

Ⓐ Osmosis Ⓑ Diffusion Ⓒ Active Transport Ⓓ Passive Transport

19. Which part of plant is responsible for transporting food?

Ⓐ Phloem Ⓑ Root Ⓒ Leaf Ⓓ Xylem

20. A tissue which is responsible for the transport of water in plant:

Ⓐ Phloem Ⓑ Pericycle Ⓒ Cortex **Ⓓ Xylem**

21. Volume of plasma in the blood is:

Ⓐ 60% **Ⓑ 55%** Ⓒ 45% Ⓓ 40%

22. The production of great number of immature and abnormal white blood cell disease is known as:

Ⓐ Leukaemia Ⓑ Myocardial Infarction Ⓒ Thalassaema Ⓓ Haemophilia

23. Number of White Blood Cells in one cubic millimeter of blood:

Ⓐ 7000- 8000 Ⓑ 6000 - 7000 Ⓒ 5000 -6000 Ⓓ 4000 - 5000

24. Water constitutes about of plasma:

Ⓐ 90%-92% Ⓑ 80% - 90% Ⓒ 70% -92% Ⓓ 72% - 80%

25. The average adult body has about volume of blood:

Ⓐ 8 liters Ⓑ 7 liters Ⓒ 6 liters **Ⓓ 5 liters**

26. The protein which maintains the water balance of blood is:

Ⓐ fibrin Ⓑ haemoglobin **Ⓒ albumin** Ⓓ fibrinogen

27. Percentage of salts in plasma is about:

Ⓐ 0.9 % Ⓑ 1.1% Ⓒ 1.0 % Ⓓ 0.8 %

28. The size of red blood cells is:

Ⓐ 12 µm Ⓑ 4 µm Ⓒ 2 µm **Ⓓ 8 µm**

29. Average life duration of a platelet is ..... days.

Ⓐ 6-7 Ⓑ 7-9 **Ⓒ 8-9** Ⓓ 7-8

30. In adult human red blood cells are produced in:

Ⓐ Liver **Ⓑ Ribs** Ⓒ Lungs Ⓓ Spleen

31. ..... prevents blood clotting.

Ⓐ Basophils Ⓑ Eosinophils Ⓒ Monocytes Ⓓ Neutrophils

32. The average life span of RBC is about:

Ⓐ five months **Ⓑ four months** Ⓒ three months Ⓓ two months

33. What percentage of plasma weight consists of protein?

(A) 7-9 % (B) 5-9% (C) 2-5 % (D) 1-2%

34. When Fibrinogen makes blood clot it separates from Blood and the remainder is called:

(A) Puss (B) Lymph (C) Plasma (D) Serum

35. When blood cells are removed from blood, remaining part is:

(A) water (B) protein (C) plasma (D) serum

36. Blood cells involved in blood clotting:

(A) plasma (B) platelets (C) red blood cells (D) white blood cells

37. Normal pH of blood is:

(A) 7.9 (B) 7.7 (C) 7.4 (D) 7.1

38. The protein which helps in blood clotting is:

(A) haemoglobin (B) Fibrinogen (C) Antigen (D) Albumin

39. Blood Cancer is:

(A) Arthritis (B) Pneumonia (C) Thalassaemia (D) Leukaemia

40. Which cell play role in body's defence:

(A) Thrombocytes (B) Basophils (C) Leukocytes (D) Erythrocytes

41. Which Blood Group contains Antigen "A":

(A) A (B) AB (C) O (D) B

42. A patient with blood group "A" can be given the blood of donor who has:

(A) Blood group A or O (B) Blood group A or AB
(C) Blood group B only (D) Blood group A only

43. ABO blood group system was introduced by:

(A) Robert Brown (B) Schwann (C) Robert Koch (D) Karl Landsteiner

44. The Universal Recipient has Antigen:

(A) Rh (B) A (C) A & B (D) B

45. Which one of the following blood groups is universal donor:

(A) B (B) A (C) O (D) AB

46. A person with blood group "AB" can donate blood to group:

(A) O (B) AB (C) A (D) B

47. A person having none of the antigen "A" and "B" has blood group:

(A) A (B) O (C) B (D) AB

48. Individuals having "AB" blood group are called:

(A) universal recipient (B) necrosis (C) universal donor (D) hypotonic

49. There are how many chambers in the Human heart:

(A) Six (B) Five (C) Three (D) Four

50. The largest artery is called:

Ⓐ Hepatic artery Ⓑ Renal artery **Ⓒ Aorta** Ⓓ Intercostal artery

51. In normal adult human, the weight of heart is:

Ⓐ 100–200 gram **Ⓑ 250–350 gram** Ⓒ 200–250 gram Ⓓ 150–200 gram

52. These are smallest blood vessels:

Ⓐ Arteries Ⓑ Lymph vessels Ⓒ Capillaries Ⓓ Veins

53. The largest and strongest chamber in heart is:

Ⓐ Right ventricle Ⓑ Right atrium Ⓒ Left atrium **Ⓓ Left ventricle**

54. The heart beat rate of healthy person is:

Ⓐ 85 beats/min Ⓑ 80 beats/min **Ⓒ 70 beats/min** Ⓓ 75 beats/min

55. The scientist who discovered the pumping action of heart was:

Ⓐ William Harvey Ⓑ Robert Brown Ⓒ Schwan Ⓓ Linnaeus

56. An artery that supplies blood to liver:

Ⓐ Coronal v artery Ⓑ Renal artery Ⓒ Femoral artery **Ⓓ Hepatic artery**

57. Exchange of materials only takes place between blood and surrounding tissues through:

Ⓐ Veins **Ⓑ Capillaries** Ⓒ All of these Ⓓ Arteries

58. The heartbeat of healthy woman per minute is:

Ⓐ 75 Ⓑ 70 Ⓒ 80 Ⓓ 85

59. Hepatic portal vein carries blood from small intestine to:

Ⓐ Colon **Ⓑ Liver** Ⓒ Heart Ⓓ Kidney

60. The blood vessels which carry blood back to the heart are called:

Ⓐ Veins Ⓑ Arterioles Ⓒ Arteries Ⓓ Capillaries

61. Which of the following blood vessel carry deoxygenated Blood:

Ⓐ Pulmonary Vein Ⓑ Renal Artery Ⓒ Aorta **Ⓓ Pulmonary Artery**

62. Which of the following tissue layer is found in all blood vessels?

Ⓐ connective tissue Ⓑ skeletal muscles **Ⓒ endothelium** Ⓓ smooth muscles

63. Ventricular systole lasts about in:

Ⓐ 0.4 sec **Ⓑ 0.3 sec** Ⓒ 0.2 sec Ⓓ 0.1sec

64. Human Heart is enclosed in Double Membranous sac called:

Ⓐ Peritonium Ⓑ Pericarp Ⓒ Pleura **Ⓓ Pericardium**

65. The blood vessels that carry blood away from heart:

Ⓐ capillaries Ⓑ lymph **Ⓒ arteries** Ⓓ veins

66. Angina pectoris is what type of pain?

Ⓐ Gastric Pain **Ⓑ Chest pain** Ⓒ Lungs pain Ⓓ Kidney pain

67. Which disease is the leading cause of death all over the world?

Ⓐ Heart attack Ⓑ AIDS Ⓒ Polio Ⓓ Cancer

68. World heart day is celebrated on:

(A) 28 September (B) 30 December (C) 28 May (D) 23 March

69. Which cells are shortened in dengue fever?

(A) chondryocytes (B) R.B.C (C) W.B.C (D) platelets

70. About what percentage of our population is diabetic?

(A) 25% (B) 20% (C) 10% (D) 5%

71. Myocardium means:

(A) Ambulus (B) Chyme (C) Muscles of heart (D) Death of tissue

72. Death of heart tissues is called:

(A) Thalassaemia (B) Myocardial infarction (C) Arteriosclerosis (D) Atherosclerosis

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Subjective

Q1: ***Define transpiration.***

Ans: *Transpiration:*

The loss of water from plan surface through evaporation is called transpiration.

Q2: ***What is difference between transpiration and stomatal transpiration?***

Ans: *The difference between transpiration and stomatal transpiration is:*

Transpiration	***Stomatal transpiration***
The loss of water from plan surface through evaporation is called transpiration.	*Most of the transpiration occurs through stomata and is called stomatal transpiration.*

Q3: ***Describe the events of transpiration.***

Ans: *Transpiration:*

Transpiration is the loss of water from plant surface through evaporation.

Functions of cuticle and lenticels:

This loss may occur through stomata in leaves, through the cuticle present on leaf epidermis, or through special openings called lenticels present in the stems of some plants.

Stomatal Transpiration:

Most of the transpiration occurs through stomata, and is called stomatal transpiration.

Function of Mesophyll Cell in Transpiration:

The mesophyll cells of leaf provide enormous surface area for the evaporation of water. Water is drawn from the xylem into mesophyll cells, from where it comes out and makes a water film on the cell walls of the mesophyll.

From here water evaporates into the air spaces of the leaf. By diffusion, water vapours then move from the air spaces towards the stomata and then pass to the outside air. Roughly 90% of the water that enters a plant is lost via transpiration.

This diagram is just for information.

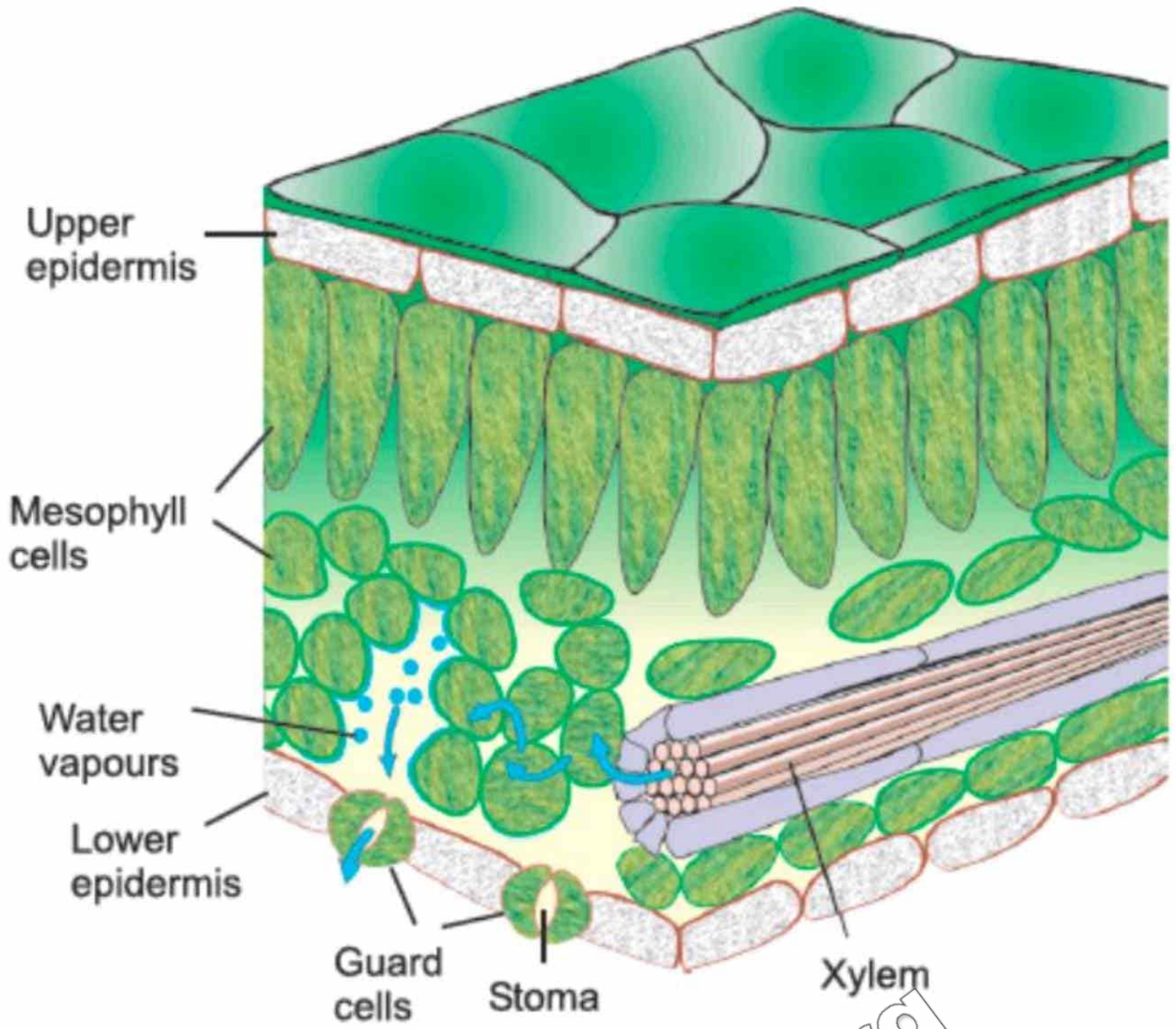


Figure Events of transpiration shown in the section of a leaf

Some plants open their stomata during night when overall water stress is low.

Q4: ***Write down the four factors affecting the rate of transpiration.***

Ans: Factors affecting the rate of transpiration include:

- *Light,*
- *Temperature,*
- *Air humidity,*
- *Air movement*
- *Leaf surface area.*
- *Gaining electrons*
- *Losing electrons*

Q5: ***Why Diffusion can work only in unicellular and simple multicellular organisms?***

Ans: One-way molecules move is by diffusion but it alone cannot supply the need. It takes much time for materials in solution to diffuse even a few inches.

Diffusion can work only in unicellular and simple multicellular organisms because every corner of their body is in close and direct contact with environment. In complex multicellular bodies, cells are far apart from the environment and such bodies need a comprehensive system for the transport of materials.

Q6: ***Why Water is vital to plant life?***

Ans: Water is vital to plant life. It is necessary not just for photosynthesis and turgor, but much of the cellular activities occur in the presence of water molecules and the internal temperature of the plant is also regulated by water.

Land plants get water and minerals from soil. After absorption by the roots, these water and minerals have to be transported to the aerial parts of the body.

Q7: ***Why Plants form beneficial relationships with soil bacteria and fungi?***

Ans: *Plants also form beneficial relationships with soil bacteria and fungi in order to increase absorption of minerals.*

Q8: ***According to the pressure–flow mechanism what is the actual force behind the movement of food in phloem?***

Ans: *Drop in the pressure at the Sink end.*

Q9: ***What is the effect of humidity and temperature on the rate of transpiration?***

Ans: *Higher temperature reduces the humidity of the surrounding air and also increases the kinetic energy of water molecules. In this way, it increases the rate of transpiration.*

The rate of transpiration doubles with everyone rise of 10 °C *in temperature. But very high temperature i.e.*40–4 5°C *causes closure of stomata, so that transpiration stops.*

Q10: ***What is effect of wind on transpiration?***

Ans: *When air is dry, water vapours diffuse more quickly from the surface of mesophyll cells into leaf air spaces and then from air spaces to outsides. This increases the rate of transpiration. In humid air, the rate of the diffusion of water vapours is reduced and the rate of transpiration is low.*

Q11: ***What is difference between lenticels and stomata?***

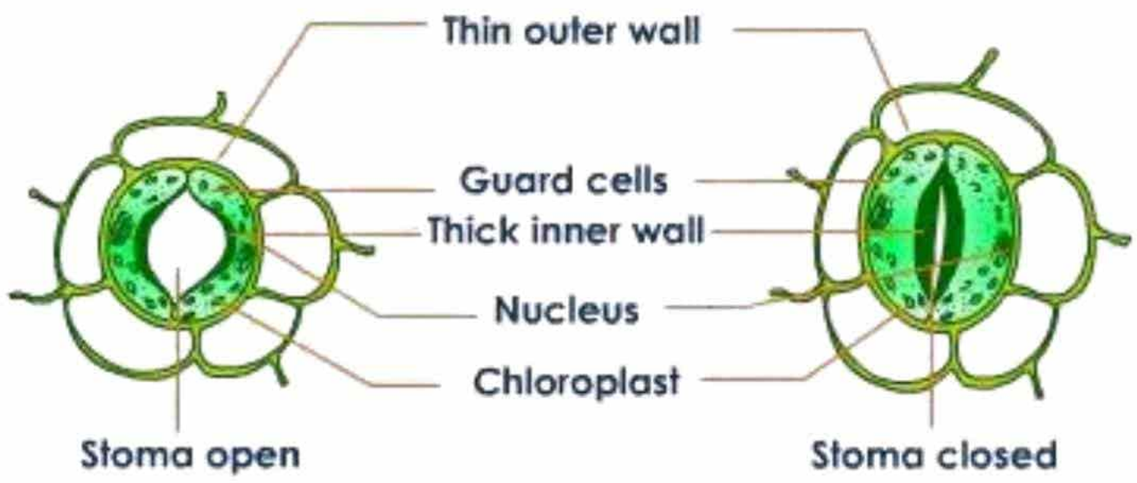
Ans: *The difference between lenticels and stomata is:*

Lenticels	***Stomata***
Lenticels are small opening for the loss of water, present in the stems of some plants.	*Stomata (singular: stoma) are minute openings in the lower epidermis of leaves guarded by guard cells. Stomata help in exchange of gases.*

Q12: ***Explain the opening and closing of stomata in leaves of plants.***

Ans: *It is responsibility of stomata to regulate transpiration via the action of guard cells. Two guard cells of stomata are attached to each other at their ends. The inner concave sides of guard cells that enclose a stoma are thicker than the outer convex sides.*

When these guard cells get water and become turgid, their shapes are like two beans and the stoma between them opens. When the guard cells loose water and become flaccid, their inner sides touch each other and the stoma close.



Q13: ***Describe importance of transpiration and explain why it is called a necessary evil?***

Ans: *Transpiration is a potentially harmful process but is unavoidable too. Transpiration may be a harmful process in the sense that during the conditions of drought, losses of water from plants result in serious desiccation, wilting and often death of the plant. It creates a pulling*

force called transpiration pull which is principally responsible for the conduction of water and salts from root the aerial parts of the plants body.

When water transpires from the surfaces of the plant, it leaves a cooling effect on plant. This is especially important in warmer environments. Wet surfaces of leaf cells allow gaseous exchange.

Q14: ***Describe the relationship between the concentration of solute and water potential.***

Ans: *Water always moves from an area of higher water potential to an area of lower water potential. The difference in the water potentials depends upon the differences in the concentrations of solute and the amounts of water.*

The relationship between the concentration of solute and water potential is inverse i.e. where there is a lot of solute the water potential is low.

Q15: ***Define cohesion-tension theory.***

Ans: *According to this theory, the mechanism by which water (along with dissolved materials) is carried upward through the xylem is called transpiration pull. Transpiration creates a pressure difference. It pulls water and salts up from the roots.*

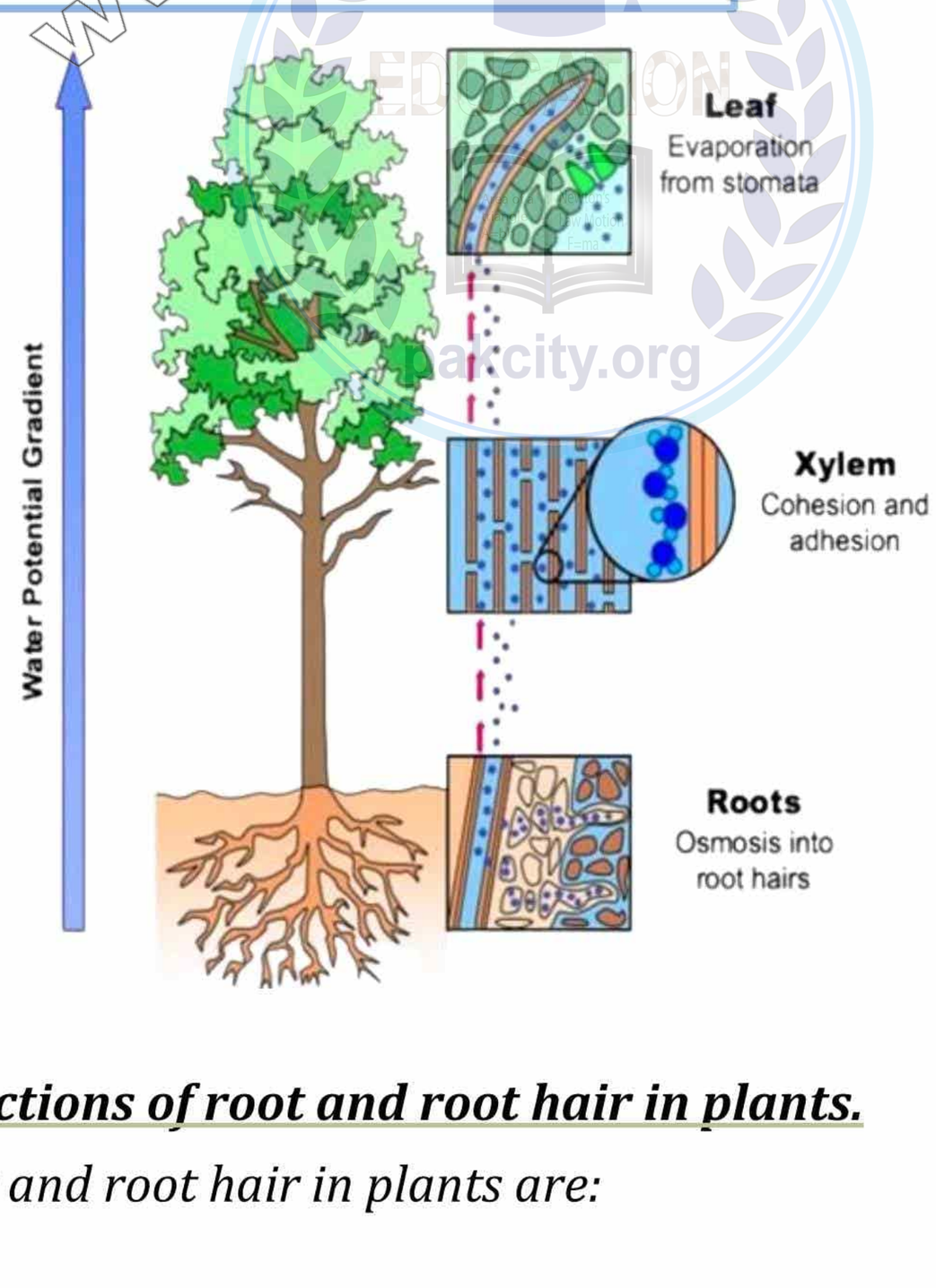
Q16: ***What is transpiration pull?***

Ans: *Transpiration creates a pulling force called transpiration pull which is principally responsible for the conduction of water and salts from root the aerial parts of the plants body.*

Reasons for the creation of the transpiration pull:

- *Water molecules adhere to the walls of xylem tube (adhesion).*
- *Water molecules cohere to each other (cohesion).*
- *Water is held in a tube (xylem) that has small diameter.*

This diagram is just for Understanding.



Q17: ***Write down the functions of root and root hair in plants.***

Ans: *The functions of root and root hair in plants are:*

Functions of Root:

- *They absorb water and salts from the soil.*
- *Roots anchor the plant in the soil.*

- *They provide conducting tissues. These tissues help in the transport of water, salts and food.*

Functions of Root Hair:

Root hairs provide large surface area for absorption water and salts. Water moves by osmosis into the root hairs. Salts enter root hairs by diffusion or active transport.

Q18: ***Differentiate between function of xylem and phloem.***

Ans: The difference between function of xylem and phloem is:

Xylem	Phloem
Xylem tissue is responsible for the transport of water and dissolved substances from roots to aerial parts. It consists of vessel elements and tracheids. Xylem is one way Street from roots to leaves for water and salts.	*Phloem tissue is responsible for the conduction of dissolved organic matter (food) between different parts of plant body. It consists of sieve tube cells and companion cells. Phloem is two way street for food.*

Q19: ***What is the difference between source and sink?***

Ans: The difference between source and sink is:

Source	Sinks
The source is exporting organ. It may be a mature leaf or storage organ.	*Sinks are the areas of active metabolism or storage.* *For example, roots, tubers, are developing fruits and leaves, and the growing regions.*

Q20: ***Define pressure flow mechanism.***

Ans: At the source, the food (sugar) is moved by active transport into the sieve tubes of phloem. Due to the presence of sugar in sieve tubes, their solute concentration increases and water enters from xylem via osmosis, this result in higher pressure in these tubes, which drives the solution towards sink.

At the sink end, the food is unloaded by active transport. Water also exits from the sieve tubes. This decreases the pressure in sieve tubes, which causes a mass flow from the higher pressure at the source to the now lowered pressure at the sink.

Q21: ***What is blood? Write the name of its parts.***

Ans: It is a specialized body fluid made up of connective tissue. It is composed of a liquid called blood plasma and 'blood cells.

Q22: ***Illustrate the functions of human blood circulatory system and its main components.***

Ans: Functions of Human Blood Circulatory System (cardiovascular system):

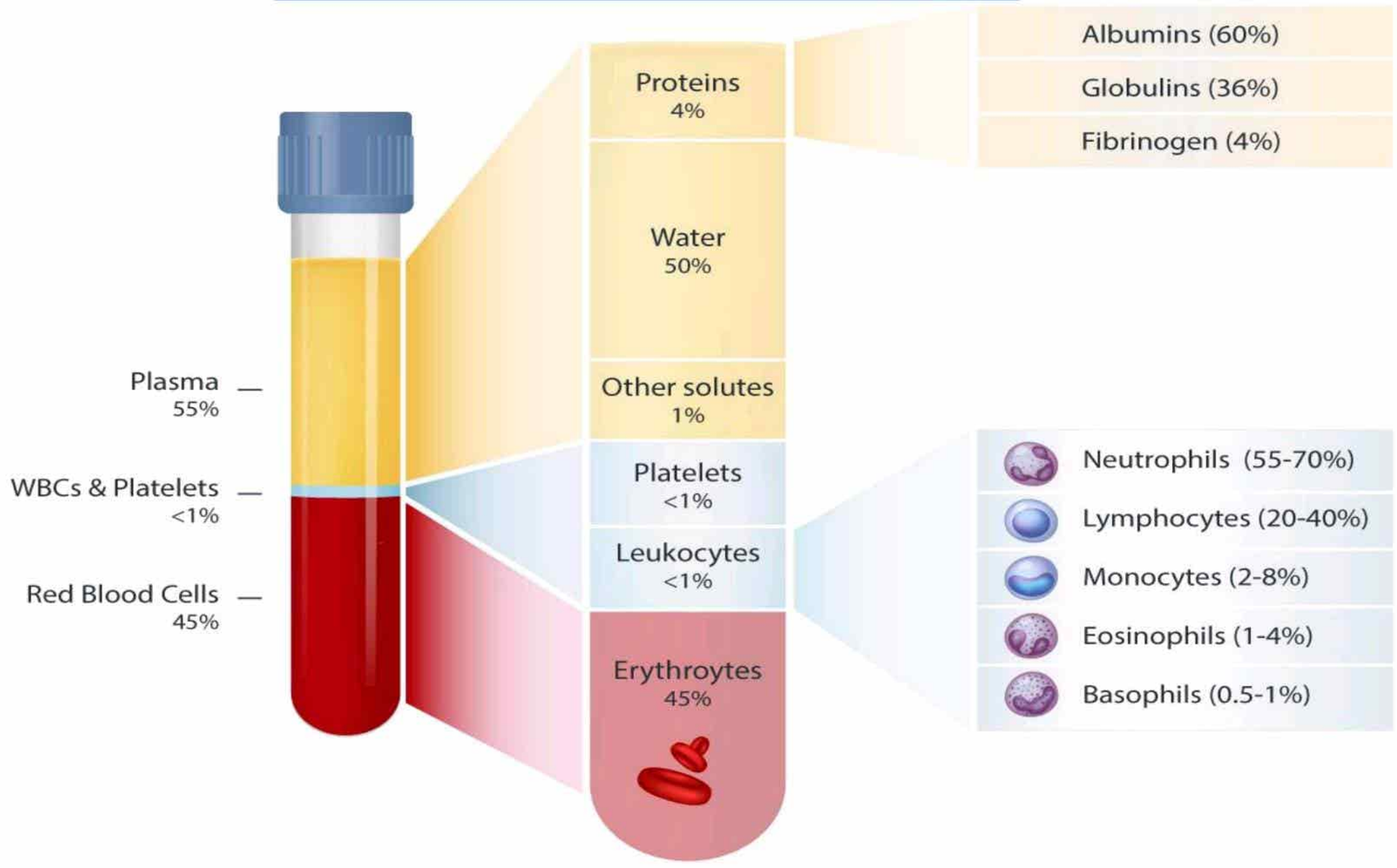
It transports nutrients, gases, hormones and wastes to and from cells, helps fight diseases and helps stabilize body temperature and pH to maintain homeostasis.

Like other vertebrates, humans have a closed blood circulatory system (meaning that the blood never leaves the network of arteries, veins and capillaries). The main components of the human blood circulatory system are the blood, the heart, and the blood vessels.

Q23: ***How many types of cells are found in blood? Write two names of these.***

Ans: Average adult body has about, 5 liters of blood. In healthy person, plasma constitutes about 55% and cell or cell like bodies constitute about 45% by volume of the blood.

This diagram is just for information.



Q24: ***State the composition of blood.***

Ans: *Composition of blood:*

Blood is a specialized bodily fluid (considered a specialized form of connective tissue) that is composed of a liquid called blood plasma and blood cells suspended within the plasma. The weight of blood in our body is about 1/12th *of our body. The average adult has a blood volume of roughly* 5 *liters.*

In a healthy person, plasma constitutes about 55 % *by volume of the blood, and cells or cell-like bodies about* 45 % *by volume of the blood.*

Q25: ***What is plasma? How is it separated from blood?***

Ans: *Plasma:*

Plasma is a part of blood. It is primarily water in which proteins, salts ions, metabolites and wastes are dissolved. Water constitutes about 90 – 92% *of plasma.* 8 - 10% *of plasma is dissolved substances.*

Separation of plasma from blood:

Blood is taken from an artery and an anticoagulant (a chemical that inhibits clotting) is mixed in it. After about 5 *minutes, plasma separate from blood cells. Plasma floats over blood cells.*

Q26: ***Write the name of any two plasma proteins.***

Ans: *Proteins make* 7–9% *by weight of plants. The important proteins present in plasma are antibodies, fibrinogen (blood clothing protein), albumin (maintains the water balance of blood) etc.*

Q27: ***Describe role of fibrinogen and albumin in blood.***

Ans: *Fibrinogen is a blood clotting protein while albumin maintains the water balance in the blood.*

Q28: ***Why the white substance called pus seen at infection sites?***

Ans: *Macrophages (produced by monocytes) and neutrophils die in the process of killing the germs. Their dead cells accumulate and make the white substance called pus, seen at infection sites.*

Q29: ***Which blood cells are the most numerous in healthy human blood?***

Ans: Red blood cells.

Q30: ***How much thalassemia patients that require blood transfusions for lifetime in Pakistan?***

Ans: There are about 60–80 million people in the world who carry the beta thalassemia, India, Pakistan and Iran are seeing a large increase of thalassemia patients that require blood transfusions for lifetime.

Q31: ***How many human blood group systems are now recognized by (ISBT)?***

Ans: A total of 29 human blood group systems are now recognized by International Society of Blood Transfusion (ISBT).

Q32: ***Why strict blood transfusion standards should be adopted?***

Ans: A number of infectious diseases (such as AIDS, hepatitis B and hepatitis C etc.) can be passed from the affected donor to recipient. Strict blood transfusion standards are observed e.g. screening of donors blood for the presence of germs etc.

Q33: ***What are red blood cells? Write their number in human blood.***

Ans: These are most numerous blood cells. These cells have nucleus when formed. In the mature RBCs of mammals, the nucleus, mitochondria, endoplasmic reticulum etc. are lost.

Number in human blood:

A cubic millimeter of contains 5 to 5.5 million red blood cells in males and 4 to 4.5 million in females.

Formation:

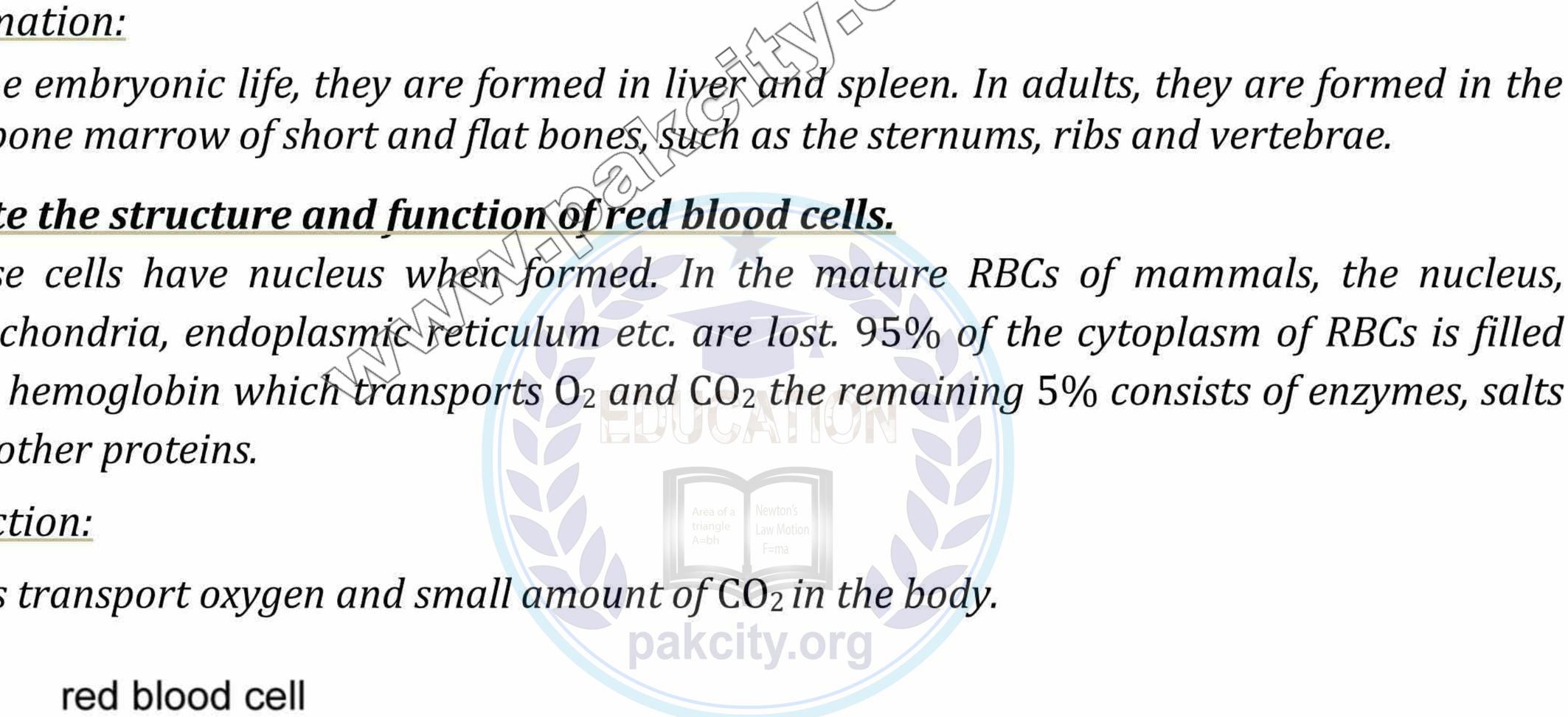
In the embryonic life, they are formed in liver and spleen. In adults, they are formed in the red bone marrow of short and flat bones, such as the sternums, ribs and vertebrae.

Q34: ***Write the structure and function of red blood cells.***

Ans: These cells have nucleus when formed. In the mature RBCs of mammals, the nucleus, mitochondria, endoplasmic reticulum etc. are lost. 95% of the cytoplasm of RBCs is filled with hemoglobin which transports O_2 and CO_2 the remaining 5% consists of enzymes, salts and other proteins.

Function:

RBCs transport oxygen and small amount of CO_2 in the body.



Q35: ***Name the muscles which are involuntary in action.***

Ans: Cardiac muscles are involuntary in action and are composed of branched striated cells, each with a single nucleus.

Q36: ***Why the heart is usually felt to be on the left side?***

Ans: *The heart is usually felt to be on the left side because the left chamber of the heart i.e. (left ventricle) is stronger (it pumps blood to all body parts).*

Q37: ***Gives evidence that the structures of the parts of heart are adaptive to their functions.***

Ans: *The walls of left ventricle are the thickest one. These are about a half- inch thick. They have enough force to push blood into the body. This gives evidence that the structures of the parts of heart are adaptive to their functions.*

Q38: ***How much white blood cells are present in the body and what are their functions?***

Ans: *The average number of white blood cells is* 7000 *to* 8000 *per millimeter cube of blood. They play important role in body's defense system by engulfing small particles, release anticoagulants or produce antibodies.*

Q39: ***Write two main types of white blood cells.***

Ans: *Leukocytes are divided into two main types.*

- *Granulocytes*
- *Agranulocytes*

Q40: ***What is difference between granulocytes and agranulocytes.***

Ans: *The difference between granulocytes and agranulocytes is:*

Granulocytes	Agranulocytes
Granulocytes are the leukocytes with granular cytoplasm. These include neutrophils, eosinophil and basophils.	*Agranulocytes are the leukocytes with clear cytoplasm. These include monocytes and lymphocytes (B & T lymphocytes).*

Q41: ***Write the function of neutrophils and basophils.***

Ans: *Neutrophils:*

They destroy small particles by phagocytosis.

Basophils:

The prevent blood clotting.

Q42: ***Write the function of* T *and* B *lymphocytes.***

Ans: *Lymphocytes are agranulocytes. They are of two types. These are* B *lymphocytes and* T *lymphocytes which produce antibodies and kill germs.*

Q43: ***You see pus at the site of infection on your skin. How is it formed?***

Ans: *White blood cells die in process of killing germs. These dead cells accumulate make with substance called pus.*

Q44: ***What are Platelets or mega karyocytes?***

Ans: *They are not cells, but are fragment of cells of bone marrow called mega karyocytes. They do not have any nucleus any pigment. Once cubic millimeter of blood contains* 250000 *platelets. The average life span of a blood platelet is about* 7 *to* 8 *days.*

They play an important role in blood clotting. The clot serves as a temporary seal at the damaged area.

Q45: ***What do you know about leukaemia?***

Ans: *Leukaemia is the production of great number of immature and abnormal white blood cells.*

Causes of leukaemia:

It is caused by a cancerous mutation in bone marrow or lymph tissue cells and results in uncontrolled production of WBCs.

Q46: ***What is thalassaemia?***

Ans: *It is also called Cooley's anaemia on the name of Thomas B, Cooley, and an American Physician. It is a genetic problem due to mutation in the gene of haemoglobin. Patient cannot transport oxygen properly. The mutation results in the production of defective haemoglobin.*

Treatment:

Blood of patients is to be replaced regularly with normal blood. It can be cured by bone marrow transplantation but it does not give 100% *cure rate.*

Q47: ***Describe the reason of production of defective leucocytes.***

Ans: *It is caused by a cancerous mutation in bone marrow or lymph tissue cells and results in uncontrolled production of WBCs.*

Q48: ***Write the names of two diseases of blood.***

Ans: *There are many types of blood disorders including:*

- *Bleeding disorders (Haemophilia)*
- *Leukaemia (Blood cancer)*
- *Thalassaemia (Cooley's Anaemia)*

Q49: ***When and who discovered ABO blood group system?***

Ans: *It was discovered by, the Austrian scientist Karl Landsteiner, in* 1900.

Q50: ***What is the difference between universal donors and universal recipients?***

Ans: *The difference between universal donors and universal recipients is:*

Universal donor	***Universal Recipients***
O blood group individuals are called universal donors, because they can donate blood to the recipients of every other blood group.	*AB blood group individuals are called universal recipients, because they can receive transfusions from the donors of every other blood group.*

Q51: ***Why O blood group individuals are called universal donors?***

Ans: *O blood group individuals are called universal donors because they can donate blood to the recipients of every other blood group.*

Q52: ***What is meant by blood group system?***

Ans: *Blood group systems are a classification of blood, based on presence or absence of antigens on the surface of RBCS. A total of* 29 *human blood group systems are now recognized by International Society of Blood Transfusion (ISBT).*

Q53: ***What is meant by ABO and Rh blood group system?***

Ans: *ABO:*

ABO blood group system was discovered by the Austrian scientist Karl Landsteiner in 1900.

There are four different blood groups in this system. These groups are distinct from each other on the basis of specific antigens (antigen A and B). These antigens are present on the surface of RBCs. After birth, two types of antibodies i.e. anti − A and anti − B, antibodies appear in the blood of individuals.

These antibodies are present according to the absence of corresponding antigen.

Rh blood group system:

In 1930's. *Karl Landsteiner discovered the Rh—blood group system.*

In this system, there are two blood groups, i.e. Rh^+ positive and Rh^- negative. These blood groups are distinct on the basis of antigens called Rh factor present on the surface of RBCs. Rh^+ positive blood group can be transfused to Rh^+ positive recipient and Rh^- negative blood group can be transfused to Rh^- negative recipient.

Rh^- Negative blood can be transfused to Rh^+ positive recipient, only if donor's blood (Rh^- negative) has never been exposed to Rh antigens and does not contain any anti Rh antibody.

Donor Blood Groups \ Recipient Blood Groups	A	B	AB	O
A	✓	×	✓	×
B	×	✓	✓	×
AB	×	×	✓	×
O	✓	✓	✓	✓

Blood Transfusion: Cross matching
✓: can be transfused
x : agglutination

Q54: ***Why AB blood group individuals are called universal recipients?***

Ans: *AB blood group individuals are called universal recipients, because they can receive transfusions from the donors of every other blood group.*

Q55: ***Differentiate between antigen and antibody.***

Ans: *The difference between antigen and antibody is:*

Antigen	***Antibody***
An antigen is a molecule that can stimulate an immune response (antibody production etc.).	*Antibody is a protective protein produced by the immune system in response to the presence of a foreign substance, called antigen.*

Q56: ***Define closed blood circulatory system and also write two main components of the human blood circulatory system.***

Ans: *A closed circulatory system means a circulatory system in which blood never leaves the network of arteries, veins and capilaries. Human body has closed circulatory system.*

Main components of human blood circulatory system:

- *Blood vessels*
- *The heart (Pumping organ)*
- *Blood (Medium)*

Q57: ***Write down names of two systems of transport of materials in human.***

Ans: *Transport in human body consists of two complex systems:*

- *Lymphatic system*
- *Blood circulatory system (cardiovascular system)*

Q58: ***Write mass and size of heart in normal adults.***

Ans: *In normal adults, mass of heart is* $250 - 350$ g *and size is equal to clenched fist.*

Q59: ***How does human heart work as a double pump?***

Ans: It works as a double pump. It receives deoxygenated (with less oxygen) blood from body and pumps it to lungs. At the same time, it receives oxygenated (with more oxygen) blood. From lungs and pumps it to the whole body.

Q60: ***What is pericardium and pericardial fluid?***

Ans: The heart is enclosed in a sac known as the pericardium. There is a fluid, known as pericardial fluid between the pericardium and the heart walls.

Function of Pericardial fluids:

It reduces friction between the pericardium and the heart during heart contractions.

Q61: ***Describe the location of heart in a human body. Also write the names of ifs chambers.***

Ans: In the human body, the heart is situated between the lungs, in the middle of the chest cavity (thorax) under the breast bone.

The human heart consists of four chambers:

Right and Left Atria:

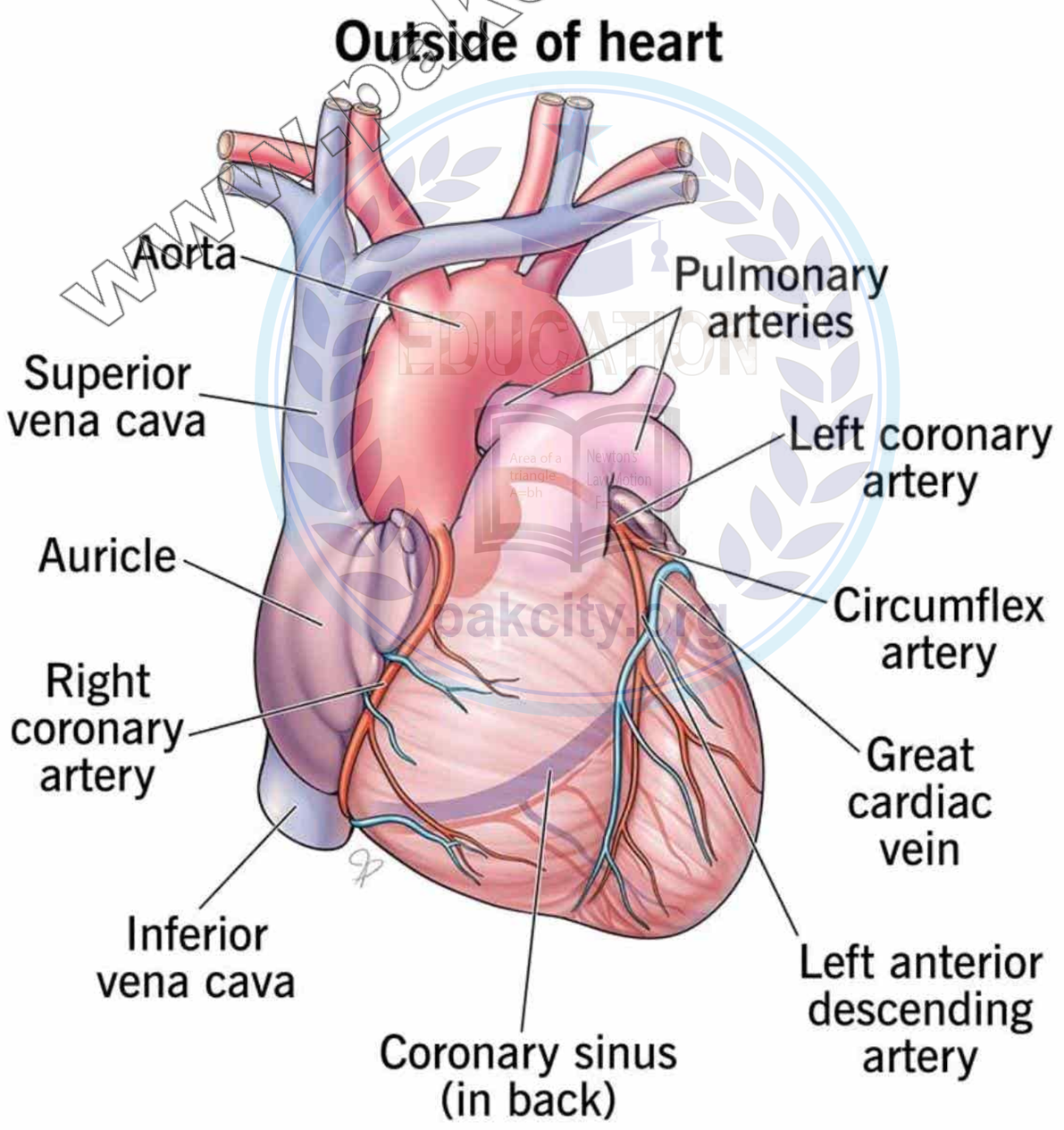
The upper thin walled chambers are called the left and right atria.

Both atria are filled simultaneously and they contract together to pump blood to ventricle.

Right and Left Ventricles:

The lower thick walled chambers are called the left and right ventricles.

The left ventricle is the largest and strongest chamber in heart. Both ventricles contract simultaneously to pump the blood out of heart.



Q62: ***Write two achievements of William Harvey.***

Ans: Achievements of William Harvey are:

- *He discovered the pumping action of heart.*
- *He also described the pathway of blood in major arteries and veins.*

Q63: ***Differentiate between bicuspid and tricuspid valve.***

Ans: The difference between bicuspid and tricuspid valve is:

Bicuspid valve	Tricuspid Valve
An opening is present between the left atrium and the left ventricle. It is guarded by a valve called bicuspid valve.	There is opening between the right atrium and the right ventricle. It is guarded by a valve called tricuspid valve. It has three flaps.

Q64: **Differentiate between systemic circulation and pulmonary circulation.**

Ans: The difference between systemic circulation and pulmonary circulation is:

Systemic circulation	Pulmonary circulation
The path way on which oxygenated blood is carried from the heart to the body tissues and in return deoxygenated blood is carried from the body tissues to the heart is called systemic circulation or circuit.	The path way on which deoxygenated blood is carried from the heart to the lungs and in return oxygenated blood is carried from the lungs to the heart is called pulmonary circulation or circuit.

Q65: **How "lubb–dubb" sound is produced during heart beat?**

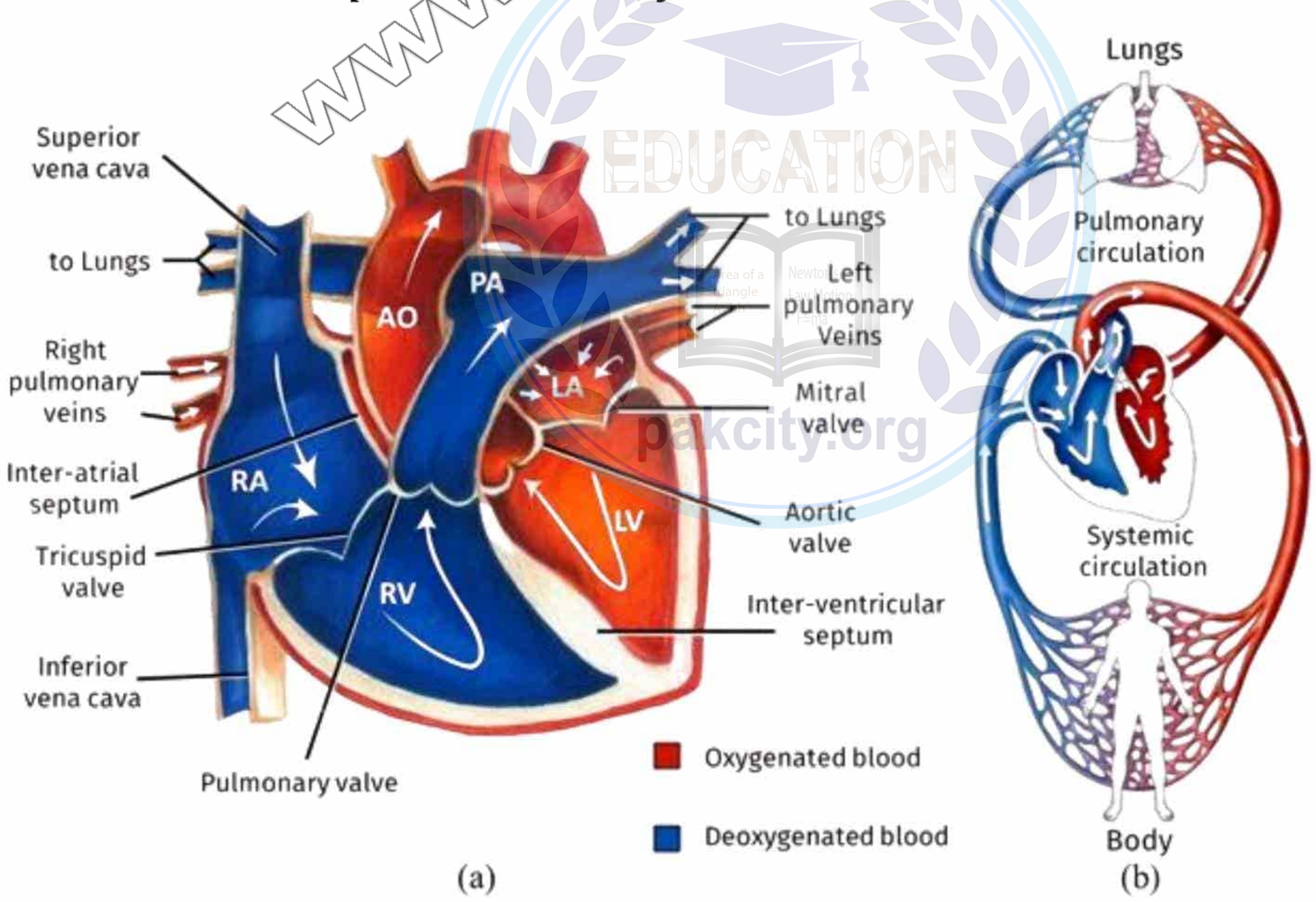
Ans: When ventricles contract, the tricuspid and bicuspid and bicuspid valves close and "lubb" sounds is produced.

Similarly when ventricles relax. The semi lunar valves close and "dub" sound is produced. "Lubb–dubb" can be heard with the help of a stethoscope.

Q66: **State the function of Heartbeat and explain the complete cardiac cycle.**

Ans: Heartbeat:

The relaxation of heart chambers fills them with blood and contraction of chambers propels the blood out of them. The alternating relaxations and contractions make up the cardiac cycle and one complete cardiac cycle makes one heartbeat.



Steps involved in complete cardiac cycle:

The complete cardiac cycle consists of following steps.

Cardiac diastole:

The atria and ventricles relax and blood is filled in aria this is called cardiac diastole

Atrial systole:

Immediately after the filling of atria, both atria contract and pump the blood towards ventricles. This period in cardiac cycle is called atrial systole.

Ventricular Systole:

When both ventricles contract and pump the blood towards body and lungs, the period of ventricular contraction is called ventricular systole.

Duration during one heartbeat:

In one heartbeat, diastole lasts about 0.4 *sec, atrial systole about* 0.1 *sec, and the ventricular systole lasts about* 0.3 *sec.*

Lubb–dubb:

When ventricles contract the tricuspid and bicuspid valves and "lubb" sound is produced. Similarly, when ventricles relax, the semilunar close and "dubb sound is produced. "Lubb–dubb" can be heard with the help of stethoscope.

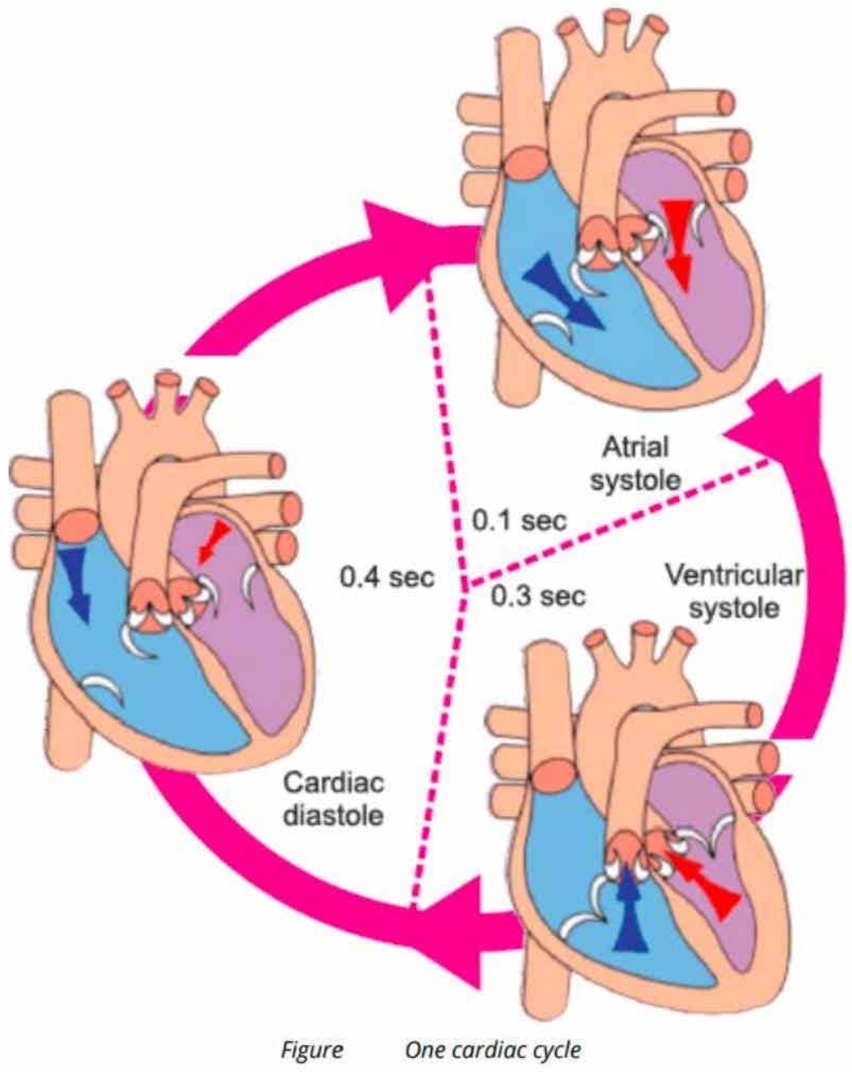


Figure One cardiac cycle

Q67: ***How can we measure the Heart rate and Pulse rate?***

Ans: *Heart rate and Pulse rate:*

The heart rate is the number of times the heart beats per minute. A resting heart rate anywhere between 60 *and* 90 *(*70 *is average) is considered in the normal range. The heart rate fluctuates a lot depending on factors such as activity level and stress level.*

Measurement of Heart rate and Pulse rate:

The heart rate can be measured by feeling the pulse. Pulse is the rhythmic expansion and contraction of an artery as blood is forced through it by the regular contractions of the heart. The pulse can be felt at the areas where to the skin for example at the wrist, neck, groin or top of the foot. Most commonly, people measure their pulse in their wrist.

Q68: ***Write function of stethoscope.***

Ans: *Stethoscope is medical instrument used for listening sounds produced within the body, chiefly in the heart or lungs.*

Q69: ***Differentiate between systole and diastole.***

Ans: *The difference between systole and diastole is:*

Systole	***Diastole***
Immediately after the filling of atria, both atria contract and pump the blood towards ventricles. This period in cardiac cycle is called atrial systole. When both ventricles contract and pump the blood towards body and lungs, the period of ventricular contraction is called ventricular systole.	*The atria and ventricles relax and blood is filled in atria. This period is called cardiac diastole.*

Q70: ***What is meant by pulse and pulse rate?***

Ans: *Pulse is the rhythmic expansion and contraction of an artery as blood is forced through it by the regular contractions of the heart.*

Measurement areas of Pulse:

The pulse can be felt at the areas where the artery is close to the skin for example at wrist, neck, groin or the top the foot. Most commonly, people measure their pulse in their wrist.

Q71: ***What is meant by heart beat?***

Ans: *The alternating relaxations and contractions of chambers of heart make up the cardiac cycle and one complete cardiac cycle makes one heartbeat.*

Q72: ***What is meant by cardiac cycle? Write the names of its main steps.***

Ans: *The alternating relaxations and contractions of chambers of heart make up the cardiac cycle and one complete cardiac cycle makes one heartbeat.*

Steps of Cardiac Cycle:

Cardiac cycle consists of following three steps.

- *Atrial Systole*
- *Ventricular Systole*
- *Cardiac diastole*

Q73: ***What are capillaries?***

Ans: *Capillaries are the smallest blood vessels which are formed by the divisions of arterioles. The walls of capillaries are composed of only a single layer of cells, the endothelium.*

Q74: ***State the function of blood vessels.***

Ans: *Blood vessels:*

The third part of the blood circulatory system is the blood vessels, which function to transport blood throughout the body. The most important vessels in the system are the arteries, veins, and capillaries.

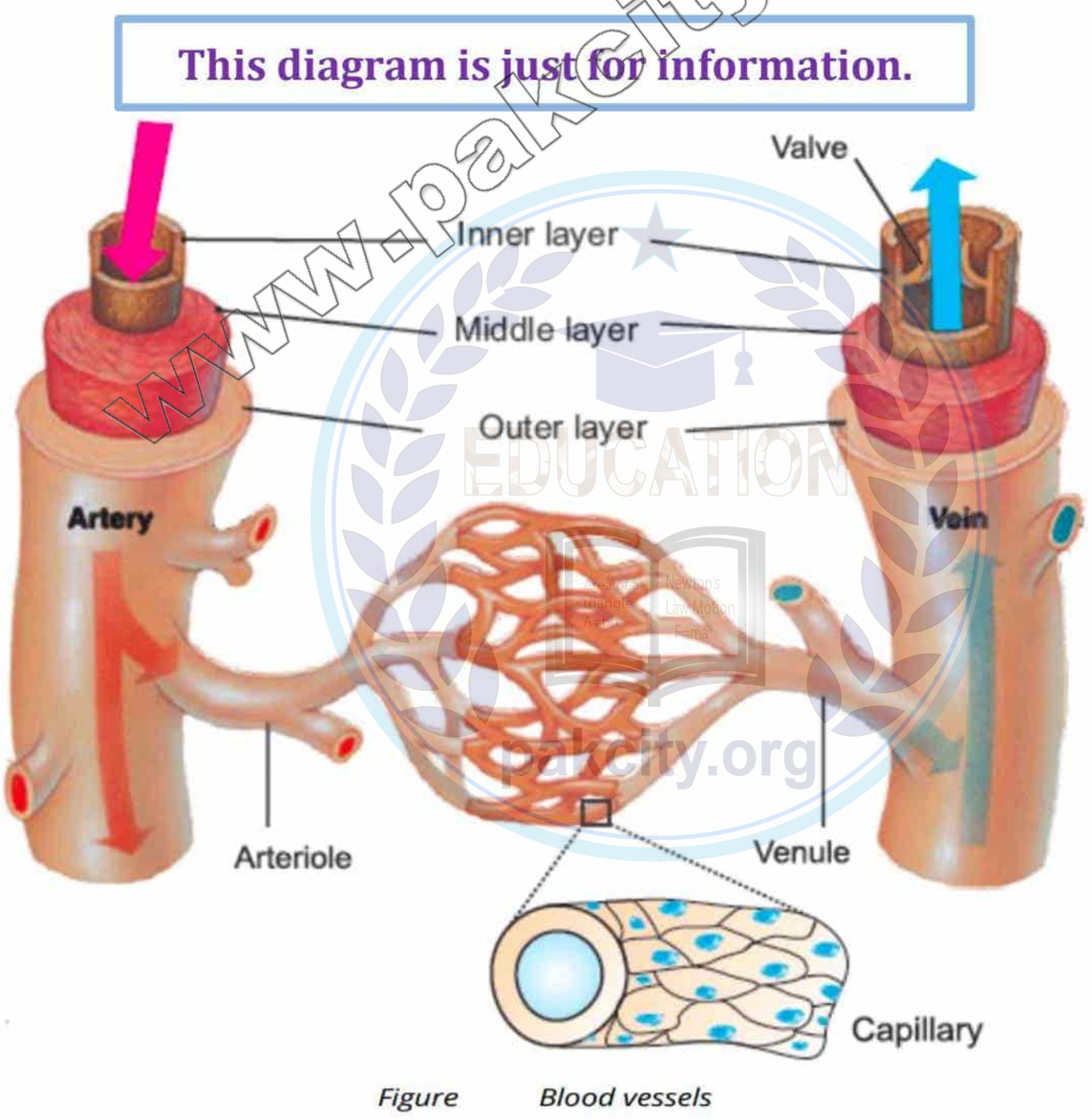


Figure Blood vessels

Q75: ***Write differences between arteries and veins.***

Ans: *The difference between arteries and veins is:*

Arteries	***Veins***
➢ *Arteries are carry blood away from heart.*	➢ *Veins are carry blood towards heart.*
➢ *Arteries have thickness and elasticity in walls.*	➢ *Veins are thin and less elastic.*
➢ *Muscles in arteries walls are thick.*	➢ *Muscles in veins walls are thin.*
➢ *In arteries blood pressure is high BP.*	➢ *In veins blood pressure is low BP.*
➢ *In arteries no valves.*	➢ *In veins vales present.*

Q76: ***Write down name of vessels found in vascular system.***

Ans: *Arteries, veins and capillaries are vessels found in vascular system.*

Q77: ***What is the function of vascular surgery?***

Ans: *Vascular surgery:*

Vascular surgery is a field in surgery in which diseases of arteries and veins (like thrombosis etc.) are managed by surgical methods. A vascular Surgeon treats the diseases of all parts of the vascular system except that of the heart and brain.

Q78: ***What is myocardial infarction?***

Ans: *The term myocardial infarction is derived from myocardium (heart muscle) and infraction (tissue death). It is commonly known as heart attack.*

Symptoms:

- *Severe chest pain is the most common symptom of heart attack.*
- *Loss of consciousness and even sudden death can occur in myocardial infarction.*
- *It often describes as a sensation of tightness, pressure of squeezing.*
- *Pain radiates, most often to left arm but may also radiate to lower jaw, neck, right arm and back.*

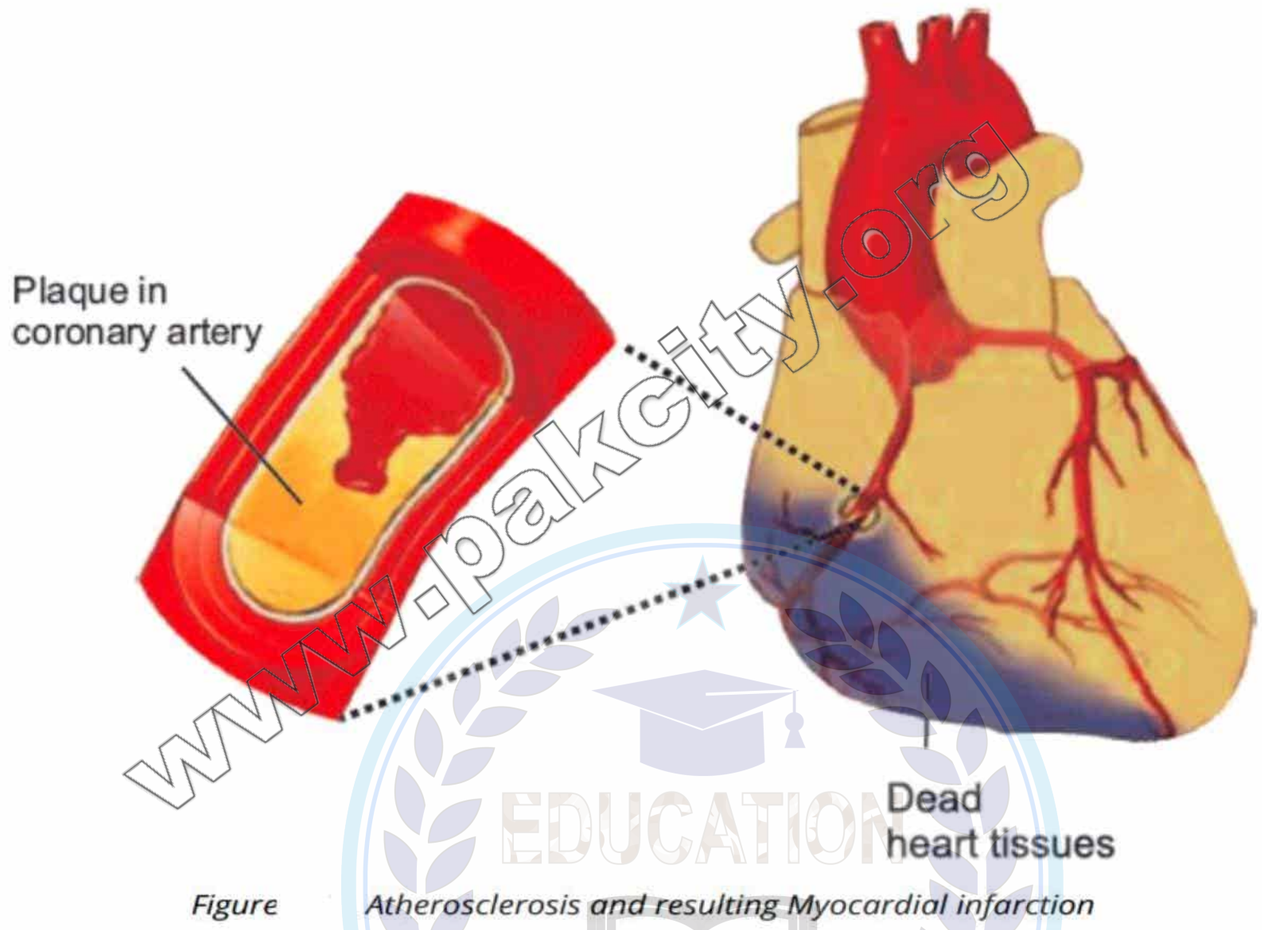


Figure *Atherosclerosis and resulting Myocardial infarction*

Q79: ***Write causes of cardio vascular disorders.***

Ans: *The causes of cardio vascular disorders:*

- *Diabetes*
- *Advanced age*
- *Tobacco smoking*
- *High blood pressure (Hypertension)*
- *Obesity*
- *Sedentary lifestyle*
- *High blood concentration of low density lipids (e.g. cholesterol) and triglycerides.*

Q80: ***What do you know about vascular surgeon and vascular surgery?*** ***OR***
Differentiate between vascular surgeon and vascular surgery.

Ans: *The difference between vascular surgeon and vascular surgery is:*

Vascular surgery	***Vascular Surgeon***
Vascular surgery is a field in surgery in which diseases of arteries and veins are managed by surgical methods.	*A vascular surgeon treats disease of all parts of blood circulatory system except that of heart and brain.*

Q81: ***What is angina pectoris? Write its symptoms.***

Ans: *Angina pectoris means "chest pain" occurs for reason similar of those which cause heart attack. But it is not as severe as heart attack.*

Symptoms angina pectoris:

The pain may occur in heart and often in left arm and shoulder. It is a warming sign that the blood supply to the heart muscles is not sufficient but the shortage is not enough to cause tissue death.

Q82: ***Differentiate between atherosclerosis and arteriosclerosis.***

Ans: *The difference between atherosclerosis and arteriosclerosis is:*

Atherosclerosis	Arteriosclerosis
Disease affecting arteries, commonly referred to as a narrowing of the arteries is called atherosclerosis.	*Arteriosclerosis is a general term describing any hardening of arteries. It occurs when calcium is deposited in the walls of arteries, it can happen when atherosclerosis is severe.*

Q83: ***Differentiate between thrombus and embolus.***

Ans: *The difference between thrombus and embolus is:*

Thrombus	Embolus
Cholesterol is accumulated in the vessels which results in the formation of multiple deposits called plaques. Plaques can form blood clots called thrombus within arteries.	*If a thrombus dislodges and becomes free floating it is called an embolus.*

Q84: ***What is the difference between angioplasty and bypass surgery?***

Ans: *The difference between angioplasty and bypass surgery is:*

Angioplasty	Bypass surgery
In most cases, myocardial infarction is treated with angioplasty. It is mechanical widening of a narrowed or totally obstructed blood vessel.	*In bypass arteries or veins from elsewhere in the patient's body is grafted to the coronary arteries to improve the blood supply to heart muscles.*

Q85: ***Describe the preventive measures about dengue fever.***

Ans: *Save your body from mosquito bites for this purpose, one should wear long sleeved shirts and trousers. Apply mosquito repellents on the body.*

Q86: ***Write the causes of dengue fever. And describe the symptoms of dengue fever.***

Ans: *Dengue fever is caused by any one of four types of dengue viruses spread by mosquitoes. When a mosquito bites a person infected with a dengue virus, the virus enters the mosquito. When the infected mosquito then bites another person, the virus enters that person's bloodstream.*

The symptoms of dengue fever:

- *Muscle and joint pain*
- *High fever*
- *Skin rashes*
- *Severe headache*

Q87: ***What is dengue fever? How can it be cured?*** ***OR***

Write down the name of mosquito which spread dengue fever.

Ans: Dengue fever is a viral infection transmitted through the mosquito "Aedes Aegypti".

Dengue fever is a viral disease, so there is no specific treatment or cure. However we treat this disease by controlling dehydration and using painkillers like paracetamol. Some time in severe cases intravenous (IV) fluid supplementation and blood transfusion is also required.

Q88: ***Why is dengue fever dangerous?***

Ans: Dengue fever is dangerous for human health because in dengue fever the level of blood platelets becomes low and it results in blood plasma leakage.

In some cases, the blood pressure falls ultimately low and it is risky for life.

Q89: ***What is effect of dengue fever on platelets? And in which regions of the world dengue fever is more common?***

Ans: In dengue fever, there is a sharp decrease in the number of platelets in bloods. Due to this reason, the patient bleeds from nose, gums and under the skin.

Dengue fever is common in tropical, subtropical and moderate climate regions including Philippine, Sri Lanka, Bangladesh, India and Pakistan. This disease has been increasing rapidly in Latin America and the Caribbean.

Q90: ***How does dengue fever spread?***

Ans: Dengue fever is caused by "Aedes Aegypti" mosquito.

This mosquito gets virus when it bites an infected person. Then this infected mosquito bites another person and virus enters in his body and attack white blood cells. In this way Dengue fever spread.

Q91: ***Describe the working of the scientists about the circulation of blood in human body.***

Ans: General plan of human blood circulatory system:

Many scientists worked for discovering the facts about the circulation of blood in human body. Two important scientists who revealed much knowledge of the blood circulatory system were Ibn-e-Nafees and William Harvey.

Ibn-e-Nafees (1210-1286) *was a physician and he is honored as the first scientists who described the pathway of blood circulation. William Harvey* (1578. 1657) *discovered the pumping action of heart and the pathway of blood in major arteries and veins.*

Q92: ***Explain the working of different arteries in arterial system.***

Ans: The Arterial System:

Functions of pulmonary arteries:

The large pulmonary trunk emerges from the right ventricle and divides into night and left pulmonary arteries, which carry the deoxygenated blood to the right and the left lungs.

Functions of aorta:

The oxygenated blood leaving the left ventricle of the heart is carried in a large artery, the aorta. The aorta ascends and forms an aortic arch. The arch curves left and descends interiorly into the body.

From the upper surface of the aortic arch three arteries emerge, which supply blood to head, shoulders and arms. As the aorta passes down through the thorax, it becomes the dorsal aorta. The dorsal aorta gives off many branches and the important ones are listed here.

Function of intercostal arteries:

Several intercostal arteries supply blood to the ribs.

Function of celiac artery and the superior mesenteric artery:

The celiac artery and the superior mesenteric artery supply blood to the digestive tract.

Function of the hepatic artery:

The hepatic artery supplies blood to the liver.

Function of renal arteries:

Inferior to these are a pair of renal arteries that supply the kidneys.

This diagram is just for information.

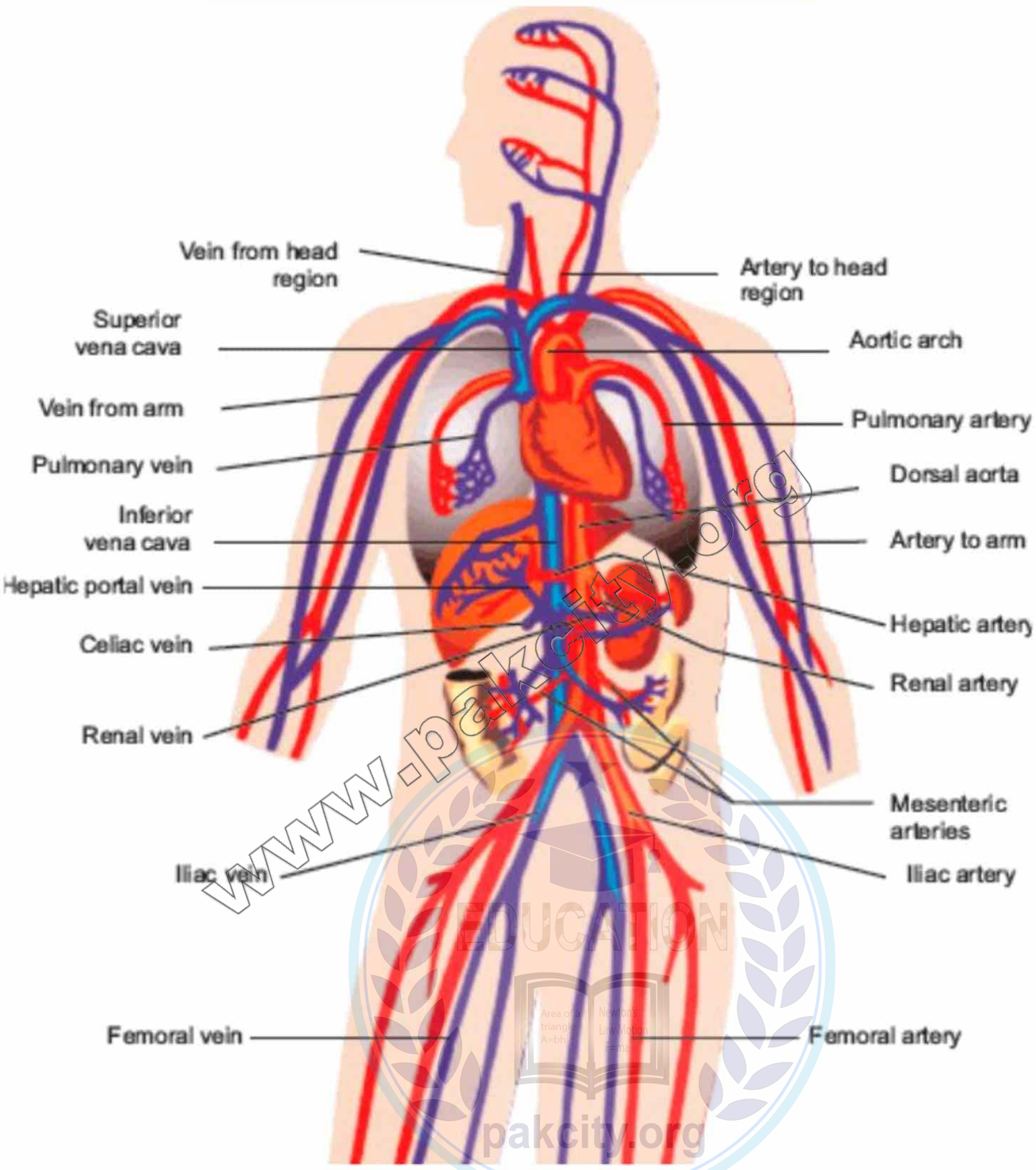


Figure : Major arteries and veins in human body

Chapter : 09	Transport

Long Questions

Q1: Describe the significance of transpiration. OR
Define Transpiration. What are factors affecting the rate of transpiration? (V.Imp)

Q2: Explain the opening and closing of stomata.

Q3: Write a note on pressure-flow mechanism. OR
Explain source and sink in the light of pressure-flow mechanism. (V.Imp)

Q4: How do plants absorb water and ions? Explain. OR
How would you relate the internal structure of root with the uptake of water and ions?

Q5: Explain the movement of water in terms of transpiration pulls.

Q6: What do you know about ABO blood group system? (V.Imp)

Q7: Where red blood cells are formed in human? Describe their structure and function. OR
Describe red blood cells and white blood cells.

Q8: State the causes and symptoms of leukemia and thallassemia.

Q9: Write a note on blood plasma.

Q10: Write a detailed note on myocardial infarction. (V.Imp)

Q11: What do you know about artereosclerosis and arthereosclerosis?

Q12: Compare the structure and function of artery, vein and capillaries.

Q13: Explain the venous system of man in detail.

Q14: Write a brief note on human arterial system. OR
Write a detail note on blood vessels. (V.Imp)

Q15: Write a detailed note on structure and function of human heart. OR

Q16: What are the four chambers of the human heart? Describe the circulation of blood through these chambers. (V.Imp)

Q17: Human heart acts like a double pump. Explain it. OR

Q18: Write a note on pulmonary and systemic circulation.

Q19: Write a note on heartbeat.