

Learning Milestone (Page 67)

1. sphygmomanometer
2. Diastolic pressure
3. Antigens
4. AB
5. coronary arteries

Check Your Knowledge

- A.** 1. a) 2. c) 3. d) 4. a) 5. a)
6. c) 7. c) 8. d)

- B.** 1. ventricles 2. Karl Landsteiner
3. pericardium 4. cardiac muscles
5. Pulmonary (*from the heart to the lungs*) 6. mitral

- C.** 1. *T* 2. *F* 3. *T* 4. *F* 5. *T*

- D.** 1. Sinoatrial node 2. Aorta 3. Universal donor
4. Sphygmomanometer

- E.** 1. a) Arteries carry oxygenated blood from the heart to the body organs.
b) Platelets help in coagulation of blood.
c) Lymphocytes present in the lymph defends the body against infections.
d) The function of the heart is to provide nutrients and circulate oxygenated blood to all cells.
2. The constituents of blood are red blood cells, white blood cells, platelets, and plasma. The following are the functions of components of blood:
- Red blood cells possess haemoglobin that combines with oxygen and reaches the cells where oxygen is imparted to the cells.
 - White blood cells fight infections in the body.
 - Platelets help in coagulation of blood.
 - Plasma contains nutrients like glucose, proteins, and amino acids.
3. Pulmonary veins
4. Left atrium
5. Artery: An artery has narrow lumen and does not have valves.
Vein: A vein has wider lumen and valves are present.

- F.** 1. The following are the functions of the chambers of the human heart:
- Right atrium: Receives deoxygenated blood from the body organs and pumps it to the right ventricle
 - Right ventricle: Passes deoxygenated blood to lungs for oxygenation via the pulmonary artery
 - Left atrium: Receives oxygenated blood from the lungs via pulmonary veins

- Left ventricle: Passes oxygenated blood to the body organs via the aorta

Note: For a diagram of the heart, refer to Fig. 5.4 on page 61 of the textbook.

2. In human beings, blood passes twice through the heart for one complete circulation. First, when it is deoxygenated, and then after getting oxygenated. This is called double circulation of blood. It involves two circulation—systemic and pulmonary.

Systemic circulation: The back and forth flow of blood between the heart and different parts of the body is called systemic circulation. In this, blood flows from the left ventricle of the heart to all parts of the body through the aorta. The aorta divides into arteries, arterioles, and finally into capillaries. Thus the aorta supplies oxygenated blood to all parts of the body. Here, the deoxygenated blood is collected by veins and finally by the venae cavae. Venae cavae return deoxygenated blood back to the right atrium.

Pulmonary circulation: The flow of deoxygenated blood from the right ventricle to the lungs for oxygenation and the flow of oxygenated blood from the lungs back to the left atrium through pulmonary veins is called pulmonary circulation.

3. Palpitation, hypertension, and cardiac arrest are common heart diseases.

Palpitation: Heart palpitations are heartbeats that suddenly become more noticeable. One may feel as if the heart is pounding or beating irregularly, often for a few seconds or minutes. However, in most cases, palpitations are harmless and not a sign of a serious problem. In some cases, palpitations may be an indication of a more serious heart condition, especially if it is accompanied by shortness of breath, dizziness, or chest pain.

Hypertension: Hypertension, or high blood pressure, is a condition in which blood pressure in the arteries continuously remains higher than the normal. During hypertension, blood flows through the blood vessels with a force greater than normal. Around 90% of high blood pressure cases are due to lifestyle factors, such as excessive salt in the diet, obesity, smoking, and drinking alcohol.

4. The ABO blood group system is the system of blood types in humans. It was discovered by Karl Landsteiner in 1901. According to the presence and absence of specific antigens from red blood cells, there are four types of blood groups. These are A, B, AB, and O.
 - If a person has blood group A, the antigen present on his or her RBCs is 'A' and antibody 'b' is found in the plasma.
 - If a person has blood group B, the antigen present on his or her RBCs is 'B' and antibody 'a' is found in the plasma.
 - A person whose RBCs have both types of antigens ('A' and 'B') belong to the blood group AB. No antibodies are present in plasma.
 - A person having blood group O has neither 'A' nor 'B' antigens present in RBCs. However, both antibodies 'a' and 'b' are present in plasma.
5. a) A universal donor is the type of human blood group that can be given to any other blood group, and a universal recipient is the type of human blood group that can receive blood from any other blood group.

- b) The pulmonary artery carries blood from the heart to lungs, and the pulmonary vein carries blood from the lungs to the heart.
- c) The vena cava brings the deoxygenated blood from body organs to the right atrium of the heart and the aorta provides the oxygenated blood from the heart to other body parts.

- G.**
- Bicuspid valve: It is present between the left atrium and left ventricle.
 - Tricuspid valve: It is present between the right atrium and the right ventricle.
 - Aortic valve: It guards the opening of the left ventricle into the aorta.
 - Pulmonary semilunar valve: It guards the opening of right ventricle into the pulmonary artery.

Analyze This

1. The diagram depicts double circulation of blood in the human body.
 X – Pulmonary circulation
 Y – Systemic circulation
2. Names of parts (i) to (vii) are as follows:
 - (i) Superior vena cava
 - (ii) Aorta
 - (iii) Pulmonary artery
 - (iv) Bicuspid valve
 - (v) Tricuspid valve
 - (vi) Inferior vena cava
 - a) Deoxygenated
 - b) Superior vena cava and Inferior vena cava
 - c) Right atrium
3. Labels (i) to (iii) are given below with their significance:
 - (i) Artery: Carries oxygenated blood away from the heart towards body organs
 - (ii) Vein: Carries deoxygenated blood towards heart from body organs
 - (iii) Capillaries: Sites for the exchange of oxygen, carbon dioxide, nutrients, and waste products between the cells and the blood