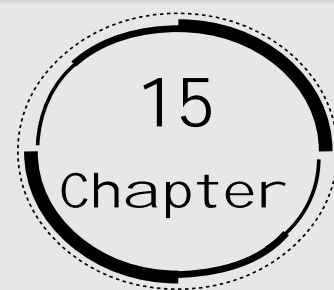


# Body Fluids and Circulation



1. Name the components of the formed elements in the blood and mention one major function of each of them.

**Ans:** Components of the formed elements present in the blood are:

- **Erythrocytes:** They play a significant role in the transportation of respiratory gases.
- **Leucocytes:** They help to fight against infections and are responsible for the immune system in the body.
- **Platelets:** They help in the coagulation of blood.

2. What is the importance of plasma proteins?

**Ans:** Plasma is made up of proteins such as fibrinogens, globulins, and albumins.

Fibrinogen plays a very important role in blood clotting. Globulin is an important plasma protein that protects the body from infectious agents. Albumin helps in maintaining osmotic balance.

3. Match column I with column II:

Column I	Column II
(a) Eosinophils	(i) Coagulation
(b) RBC	(ii) Universal Recipient
(c) AB Group	(iii) Resist Infections
(d) Platelets	(iv) Contraction of Heart
(e) Systole	(v) Gas transport

**Ans:**

Column I	Column II
(a) Eosinophils	(iii) Resist Infections
(b) RBC	(v) Gas transport
(c) AB Group	(ii) Universal Recipient

(d) Platelets	(i) Coagulation
(e) Systole	(iv) Contraction of Heart

#### 4. Why do we consider blood as a connective tissue?

**Ans:** Like the different connective tissues, blood is also mesodermally derived and has an extracellular matrix known as plasma. It connects different body systems and takes part in the transportation of gas and varied nutrients within the body and the removal of the waste materials out of the body. Hence, blood is taken into account a connective tissue.

#### 5. What is the difference between lymph and blood?

**Ans:** Differences between lymph and blood are:

Lymph	Blood
Colourless	Red
Transparent	Opaque
Proteins Abent	Proteins Present
It contains lymphocytes which are known to be responsible for the immune responses.	It mainly helps in the transportation of respiratory gases and various nutrients inside the body.

#### 6. What is meant by double circulation? What is its significance?

**Ans:** Double circulation- It is defined as the process in which blood passes 2 times through the heart during one complete cycle. This process involves two types of blood circulations:

**(i) Systemic circulation:** In this method, the circulation of oxygenated blood takes place from the left ventricle of the heart to the aorta. Then a network of arteries, arterioles, and capillaries supplies this oxygenated blood to various tissues in the body. From tissues, the deoxygenated blood is collected by a system of venules, veins, and vena cava, and is emptied into the right atrium.

**(ii) Pulmonary circulation:** Thi circulation involves the circulation of deoxygenated blood from the right ventricle to the pulmonary artery, which then carries blood to the lungs for getting oxygenated. Then, the oxygenated blood from the lungs is carried by the pulmonary veins into the left atrium.

**Significance of double circulation:** In double circulation, complete separation of oxygenated and deoxygenated blood takes place which allows a more efficient supply of oxygen to the body cells.

**7. Write the differences between:**

- (a) Blood and Lymph**
- (b) Open and Closed system of circulation**
- (c) Systole and Diastole**
- (d) P-wave and T-wave**

**Ans:** (a) Differences between lymph and blood are:

<b>LYMPH</b>	<b>BLOOD</b>
Colourless	Red
Transparent	Opaque
Proteins Abent	Proteins Present
It contains lymphocytes which are known to be responsible for the immune responses.	It mainly helps in the transportation of respiratory gases and various nutrients inside the body.
Flow slowly	Flow Rapidly

(b) Differences between the open and closed systems of circulation are:

<b>Open system of circulation</b>	<b>Closed system of circulation</b>
In an open system, hemolymph directly fills the organs and tissues.	In a closed system, the blood circulates within closed vessels.
The intestinal fluid and blood are mixed in this.	Blood and interstitial fluid are distinct from each other.
Ex- molluscs, and arthropods.	Ex-annelids and vertebrates.
Blood is directly pumped into the cavity of the body.	Blood is pumped with the help of vessels by the heart.

(c) Differences between Systole and Diastole are:

<b>SYSTOLE</b>	<b>DIASTOLE</b>
Contraction of heart muscle takes place.	Relaxation of heart muscle takes place.
A decrease in the volume of the heart chamber is seen.	The heart chamber retains its normal size.

(d) Differences between P-wave and T-wave are:

<b>P WAVE</b>	<b>T WAVE</b>
Indicate depolarization of atria.	Indicates ventricular repolarization.
Atria contracts.	Ventricles relaxes.

**8. Describe the evolutionary change in the pattern of the heart among the vertebrates.**

**Ans:** A comparative study of the structures of hearts of vertebrates reveals that there is an evolutionary change in the pattern of heart among the vertebrates. All of the vertebrates possess a muscular chambered heart. The fishes have a 2-chambered heart; with an atrium and a ventricle, which then evolved into the three-chambered heart in amphibians and reptiles which have two atria and one ventricle. In this type of heart, both the pureblood and impure blood get mixed in the ventricle. In case of higher animals like aves, reptiles, and mammals, the heart further evolved out as a well-developed, 4-chambered structure with two atrium and two ventricles. All these groups of animals exhibit double circulation and hence there is no mixing of oxygenated and deoxygenated blood.

**9. Why do we call our heart myogenic?**

**Ans:** The normal activities of our heart are autoregulated by specialized muscles known as nodal tissues. Due to this, the heart is known as myogenic.

**10. The sino-atrial node is called the pacemaker of our heart. Why?**

**Ans:** The sino-atrial (SA) node is a specialized bundle of neurons that have the ability to generate action potential without any external stimuli. This action potential is responsible for initiating and maintaining the rhythmic contraction of the heart. Due to this ability, the SA Node is called the pacemaker.

**11. What is the significance of atrioventricular nodes and atrioventricular bundles in the functioning of the heart?**

**Ans:** Both the atrioventricular node (AVN) and the atrioventricular (AV) bundle are stimulated by the action potential triggered by the sinus node (SAN) and transmit the stimulus to the remaining parts of the heart, thereby helping to transmit the heartbeat to different parts of the heart .

**12. Define a cardiac cycle and the cardiac output.**

**Ans: Cardiac cycle:** The successive contraction and expansion of different heart chambers in a cyclical manner is called the cardiac cycle.

**Cardiac Output:** The volume of blood that the heart pumps in one minute is called cardiac output. The average cardiac output of a healthy man is 5 liters per minute.

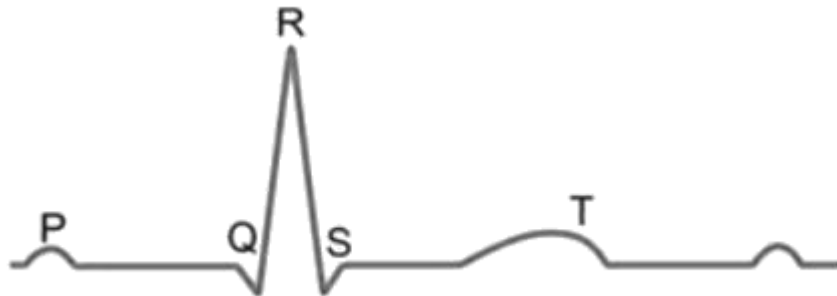
**13. Explain heart sounds.**

**Ans:** The sounds that are made when the heart valves close and open are called heart sounds. A normal heart makes two distinctive sounds during each cardiac cycle, the first sound is called lub and the second sound is called dub.

- Lub: This sound is produced by the closing of the tricuspid and bicuspid valves at the beginning of the systole.
- Dub: This sound is produced by the closing of the half-moon keys at the beginning of the diastole.

**14. Draw a standard ECG and explain the different segments in it.**

**Ans:**



The electrocardiogram (ECG) is the graphical representation of the cardiac cycle generated by the electrogram. Below is a schematic of a standard EKG.

Each ECG peak, represented by the letters P to T, corresponds to a certain electrical activity of the heart.

- (i) The first "P" peak indicates atrial depolarization (atrial contraction).
- (ii) The following QRS complex represents the depolarization of the ventricles (ventricular contraction).
- (iii) The final T wave represents ventricular repolarization (ventricular relaxation).