RADIOLOGY SEC B PHYSIOLOGY, 2ND SEMESTER

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Attempt all questions. Every question carry 10 marks.

Q1. Write the functions and composition of blood?

ANS **FUNCTION OF BLOOD**

Blood has three main functions: transport, protection and regulation

* supplying oxygen to cells and tissues
* providing essential nutrients to cells, such as amino acids, fatty acids, and glucose
* removing waste materials, such as carbon dioxide, urea, and lactic acid
* protecting the body from infection and foreign bodies through the white blood cells
* transporting hormones from one part of the body to another, transmitting messages, and completing important processes
* regulating acidity (pH) levels and body temperature
* engorging parts of the body when needed, for example, a penile erection as a response to sexual arousal
* Another important function of the blood is its protective action against disease. White blood cells defend the body against infections, foreign materials, and abnormal cells

**COMPOSTION OF BLOOD**

When a sample of blood is spun in a centrifuge machine, they separate into the following  constituents: Plasma, buffy coat and erythrocytes.

**Plasma**

The liquid state of blood can be contributed to plasma as it makes up for 50% of blood. It is pale yellow in colour and when separated, it consists of salts, nutrients, water and enzymes H

**Red Blood Cells (RBC)**

Red blood cells consist of Haemoglobin, a protein. They are produced by the bone marrow to primarily carry oxygen to the body and carbon dioxide away from it.

**White Blood Cells (WBC)**

They circulate throughout our body and originate from the bone marrow.

**Platelets**

Tiny disc-shaped cells that help regulate blood flow when any part of the body is damaged, thereby aiding in fast recovery through clotting of blood.

Q2. What is erythrocyte, erythropoiesis, erythrocytosis and erythropenia?

ANS **ERTHROCYTE**

A type of blood cell that is made in the bone marrow and found in the blood. Erythrocytes contain a protein called hemoglobin, which carries oxygen from the lungs to all parts of the body. Also called RBC and red blood cell

**ERYTHROPOIESIS**

Erythropoiesis is the process which produces red blood cells, which is the development from erythropoietic stem cell to mature red blood cell. It is stimulated by decreased O₂ in circulation, which is detected by the kidneys, which then secrete the hormone erythropoietin.

**ERTHROCYTOSIS**

Erythrocytosis is a condition in which your body makes too many red blood cells (RBCs), or erythrocytes. RBCs carry oxygen to your organs and tissues. Having too many of these cells can make your blood thicker than normal and lead to blood clots and other complications.

There are two types of erythrocytosis:

**Primary erythrocytosis**. This type is caused by a problem with cells in the bone marrow, where RBCs are produced. Primary erythrocytosis is sometimes inherited.

**Secondary erythrocytosis**. A disease or the use of certain drugs can cause this type.

**ERTHROCYTES**

The reduction in the number of red blood cells in the blood. Is know is as erythrocytes

Q3. What is platelets and write about clotting mechanism and its all steps?

ANS

**PLATELETS**

In addition to being the smallest blood cell, platelets are also the lightest.  Therefore they are pushed out from the center of flowing blood to the wall of the blood vessel.  There they roll along the surface of the vessel wall, which is lined by cells called endothelium.  The endothelium is a very special surface, like Teflon, that prevents anything from sticking to it.  However when there is an injury or cut, and the endothelial layer is broken, the tough fibers that surround a blood vessel are exposed to the liquid flowing blood.  It is the platelets that react first to injury.  The tough fibers surrounding the vessel wall, like an envelop, attract platelets like a magnet, stimulate the shape change and platelets then clump onto these fibers, providing the initial seal to prevent bleeding, the leak of red blood cells and plasma through the vessel injury.

**CLOTTHING MECHANSIM**

The human body protects against loss of blood through the clotting mechanism. Vascular mechanisms, platelets, coagulation factors, prostaglandins, enzymes, and proteins are the contributors to the clotting mechanism which act together to form clots and stop a loss of blood.

The clotting mechanism involves the circulatory system which includes the lineage of blood cells and blood vessels

**Primary hemostasis**: Formation of a weak platelet plug

**Secondary hemostasis**: Stabilizing the weak platelet plug into a clot by the fibrin network

 vascular spasm, the formation of a platelet plug, and coagulation, in which clotting factors promote the formation of a fibrin clot. Fibrinolysis is the process in which a clot is degraded in a healing vessel. Anticoagulants are substances that oppose coagulation

Q4. Write a detail note on ABO system?

ANS **AOB**

The A, B, and O blood groups were first identified by Austrian immunologist [Karl Landsteiner](https://www.britannica.com/biography/Karl-Landsteiner) in 1901

 The classification of human blood based on the inherited properties of red blood cells ([erythrocytes](https://www.britannica.com/science/red-blood-cell)) as determined by the presence or absence of the [antigens](https://www.britannica.com/science/antigen) A and B, which are carried on the surface of the red cells. Persons may thus have [type A](https://www.britannica.com/science/type-A-blood), [type B](https://www.britannica.com/science/type-B-blood), [type O](https://www.britannica.com/science/type-O-blood), or [type AB](https://www.britannica.com/science/type-AB-blood) blood.

**ABO SYSTEM**

Blood containing red cells with type A [antigen](https://www.britannica.com/science/antigen) on their surface has in its [serum](https://www.britannica.com/science/serum) (fluid) [antibodies](https://www.britannica.com/science/antibody) against type B red cells. If, in [transfusion](https://www.britannica.com/science/blood-transfusion), type B blood is injected into persons with type A blood, the red cells in the injected blood will be destroyed by the antibodies in the recipient’s blood. In the same way, type A red cells will be destroyed by anti-A antibodies in type B blood. Type O blood can be injected into persons with type A, B, or O blood unless there is incompatibility with respect to some other blood group system also present. Persons with type AB blood can receive type A, B, or O blood.

| system | recipient type | donor red cell type | donor plasma type |
| --- | --- | --- | --- |
|  | | | |
| ABO | A | A\* or O | A or AB |
| ABO | B | B or O | B or AB |
| ABO | O | O only | O, A, B, or AB |
| ABO | AB | AB\*, A\*, B, or O | AB |
| Rh | positive | positive or negative | positive or negative |
| Rh | negative | negative or positive\*\*, \*\*\* | negative or positive\*\* |

Q5.(i) A person fell down from a tree and become unconscious, with bleeding from head, what will you do as a first aid?

ANS first I will try to stop bleeding I will do bandage then Check whether the person is breathing. If they’re not breathing, I will call local emergency services immediately and prepare to begin [CPR](https://www.healthline.com/health/cpr-adult). If he is breathing, position the person on their back.

.(ii) you have to meet with your friend and you came to know he is covid positive, what precautionary measures will you take?

ANS first I will do test and use mask and isolate my self