

Functions of Blood Constituents (pages 99 to 103)

1. Identify the blood constituents described below:
 - a) Yellow-tinted fluid that transports blood cells *Plasma*
 - b) Red cell that does not contain a nucleus *Red blood cell (also called an erythrocyte)*
 - c) Small cell fragment that plays a role in coagulation *Platelet (also called a thrombocyte)*
 - d) Cell that has a nucleus and is able to leave blood vessels *White blood cell (also called a leucocyte)*
 - e) The most common type of blood cell *Red blood cell*

2. What gives red blood cells their colour? *Hemoglobin*

Blood Types (pages 103 to 106)

3. Answer the following questions based on the ABO and Rhesus systems:
 - a) How many different agglutinogens do individuals with AB positive blood have on their red blood cells? *Three: Agglutinogens A, B and Rh*
 - b) Which agglutinins do individuals with O negative blood have in their plasma? *Anti-A, anti-B and anti-Rh agglutinins (if the person has previously been in contact with Rh+ blood)*

4. State whether agglutination will occur in each of the following cases. Explain your answer.
 - a) A transfusion of A positive blood to an individual with AB positive blood *No. The individual does not possess any agglutinins against the agglutinogens in the blood received.*

- b) A transfusion of O negative blood to an individual with B negative blood *No. The individual does not possess any agglutinins against the agglutinogens in the blood received.*
- c) A transfusion of AB negative blood to an individual with B positive blood *Yes. The individual possesses agglutinins against the agglutinogens in the blood received (anti-A).*

The Anatomy of the Circulatory System (pages 107 to 111)

5. Identify the parts of the circulatory system described below:
 - a) Cardiac chambers that contract to pump blood out of the heart *Ventricles*
 - b) Blood vessels that carry blood to the lungs *Pulmonary arteries*
 - c) Structures that allow blood to flow from one compartment to another and prevent reflux *Valves*
 - d) Cardiac chambers where blood arrives in the heart *Atria*
 - e) Blood vessels with thick, elastic walls *Arteries*
 - f) Blood vessels that allow exchanges to occur between blood and cells *Capillaries*
 - g) Blood vessels that carry blood to the right atrium *Inferior and superior venae cavae*
 - h) The largest artery in the human body *Aorta*

The Physiology of the Circulatory System (pages 112 to 115)

6. a) What is the function of pulmonary circulation? *It carries blood that contains carbon dioxide (CO₂) to the lungs, where it gets rid of this waste and is resupplied with oxygen (O₂).*
- b) What is the function of systemic circulation? *It carries oxygenated blood to the cells to supply them with oxygen (O₂) and nutrients. It also collects their waste products, such as carbon dioxide and water.*

7. a) State which of the following structures a red blood cell passes through during its trajectory from the right ventricle to the left atrium of the heart. Place them in the order in which the red blood cell passes through them. Note: not all of the structures listed below will be part of your answer.

- 1) Aorta (aortic artery)
- 2) Pulmonary arteries
- 3) Pulmonary arterioles
- 4) Pulmonary capillaries
- 5) Left atrium
- 6) Pulmonary veins
- 7) Pulmonary venules
- 8) Left ventricle

Answer: 2, 3, 4, 7, 6, 5

- b) What type of circulation is described in a)? *Pulmonary circulation*

The Lymphatic System and Immunity (pages 116 to 119)

8. Which of the following organs are not included in the lymphatic system?
- a) The tonsils
 - b) Lymphatic vessels and their lymph nodes
 - c) Bone marrow
 - d) The heart
 - e) The spleen
 - f) The thymus

Answer: *The heart*

9. Match each statement in the left-hand column with a term in the right-hand column. You may use the terms in the right-hand column more than once.

a) We transport certain molecules such as fats.
1 and 4

b) This fluid surrounds all cells in most tissues and organs. *2*

c) We return excess interstitial fluid to the blood circulation. *4*

d) This fluid flows inside lymphatic vessels. *1*

e) We filter lymph by removing all cellular debris, harmful bacteria and viruses. *5*

f) This fluid transports blood cells inside blood vessels. *3*

1) Lymph

2) Interstitial fluid

3) Plasma

4) Lymphatic vessels

5) Lymph nodes and lymphatic organs

10. Some white blood cells protect the body by producing specific antibodies. Name another way in which certain white blood cells protect the body against harmful antigens.

Phagocytosis: white blood cells travel to the site of the infection to engulf and destroy the harmful antigen.

11. Indicate whether the following statements describe specific immunity, non-specific immunity or artificial immunity:

- a) Immunity against antigens by natural barriers such as the skin
Non-specific
- b) Immunity the body acquires after the flu
Specific, natural
- c) Immunity provided by the production of antibodies
Specific, natural (following an illness); specific, artificial (following vaccination)
- d) Immunity provided by the rubella vaccine
Specific, artificial

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The Anatomy and Physiology of the Urinary System (pages 121 to 124)

1. Match each of the functions described below to one of the following organs: kidney, ureter, urethra or bladder.
- a) This organ is a long tube that transports urine from the kidneys to the bladder. *Ureter*
- b) This organ is expandable and stores urine. *Bladder*
- c) This organ filters blood to separate what the body must excrete from what the body needs to keep. *Kidney*
- d) This tube is located at the exit of the bladder and carries urine to the outside of the body. *Urethra*

Maintaining Equilibrium in the Bloodstream (pages 124 and 125)

2. Each of the situations described below has an effect on the excretory system.
- a) Explain this effect by choosing from one of the two following consequences:
- The volume of urine increases.
 - The volume of urine decreases.
- b) Next, explain why this effect occurs.

- 1) Your little brother is drinking the lemonade you have just made. *The volume of urine will increase because the amount of liquid consumed has increased.*
- 2) Your mother is having medical tests performed tomorrow. She carefully follows the doctor's advice, i.e. she is not allowed to eat or drink from 8 p.m. onward. *The volume of urine will decrease because no fluids are being consumed.*
- 3) Your aunt is on a new diet. She no longer eats any sweet or salty food. *The volume of urine will increase because a decrease in the amount of salt consumed causes the kidneys to remove more water from the blood so that the blood's mineral concentration will increase.*
- 4) It is a hot, sunny day, and you decide to work out. After 40 minutes of running, you are sweating profusely. *The volume of urine will decrease because when the body perspires heavily, the kidneys adapt by removing less water from the blood.*