



Attempt questions first; check the separate key afterward. Use labelled diagrams where asked. Give scientific reasons; answer key covers closed questions.

A. Very short answers - 1 mark each

1. Name the most abundant formed elements of human blood.
2. Name the blood elements mainly involved in clotting.
3. Name the plasma protein important in osmotic balance.
4. Which blood group has both A and B antigens on red cells?
5. Name the normal cardiac pacemaker.
6. Which valve lies between left atrium and left ventricle?
7. Name the vessel carrying blood from right ventricle to lungs.
8. What does the ECG P wave represent?

B. Short answers / practice - 2 marks each

9. Compare plasma and serum.
10. Describe erythrocytes, leucocytes and platelets with functions.
11. Compare granulocytes and agranulocytes.
12. Explain the main stages of blood coagulation.
13. Describe ABO grouping using antigens and antibodies.
14. Why must transfusion compatibility consider more than ABO group alone?
15. Explain Rh incompatibility in a subsequent pregnancy at a basic level.
16. Compare blood and lymph.
17. State three functions of lymph.
18. Describe heart chambers, septa and valves.
19. Trace systemic and pulmonary circulation.
20. Why is double circulation advantageous in humans?

C. Application / reasoning - 3 marks each

21. Distinguish arteries, veins and capillaries structurally.
22. Explain the sequence of excitation through cardiac conducting tissue.
23. What produces the first and second heart sounds?
24. Find cardiac output for stroke volume 70 mL and rate 72/min.
25. Find stroke volume if output is 5.6 L/min and rate 80/min.
26. Find duration of one cardiac cycle at 75 beats/min.
27. What does the ECG QRS complex represent?
28. What does the T wave represent?
29. Explain neural and hormonal regulation of cardiac activity.
30. Differentiate angina, heart failure and cardiac arrest.
31. Explain how coronary artery narrowing can affect heart muscle.

D. Extended practice - 5 marks each

32. Draw the human heart and trace blood flow through all chambers.
33. Describe a complete cardiac cycle, including valves, pressures and sounds.
34. Explain ABO and Rh groups and the biological basis of incompatibility.
35. Draw a normal ECG and connect its waves to electrical events and the cardiac cycle.

ANSWER KEY - Numerical / closed questions

- 1) Erythrocytes. 2) Platelets. 3) Albumin. 4) AB. 5) SA node. 6) Mitral/bicuspid valve. 7) Pulmonary artery. 8) Atrial depolarisation. 24) $5040 \text{ mL/min} = 5.04 \text{ L/min}$. 25) 70 mL. 26) 0.8 s. 27) Ventricular depolarisation. 28) Ventricular repolarisation.