Q1. Which plasma protein helps in osmotic balance and acts as a carrier for various substances?

A. Fibrinogen
B. Globulin
C. Albumin
D. Thrombin

Answer: C. Albumin
Explanation: Albumin is the most abundant plasma protein. It maintains oncotic pressure (osmotic pressure) and also acts as a carrier protein.

Q2. Which of the following statements about lymph is incorrect?

A. It contains RBCs
B. It transports fats
C. It is involved in immune responses
D. It helps return interstitial fluid to blood

Answer: A. It contains RBCs
Explanation: Lymph is a colorless fluid, devoid of RBCs, but contains WBCs, especially lymphocytes.

Q3. The enzyme responsible for dissolving fibrin clot is:

A. Fibrinogen
B. Plasmin
C. Thrombin
D. Heparin

Answer: B. Plasmin
Explanation: Plasmin breaks down fibrin into degradation products, aiding in clot removal after healing.

Q4. Which is correctly matched?

A. Neutrophils – 20–25%
B. Basophils – 0.5–1%
C. Monocytes – 50–70%
D. Eosinophils – 0–0.5%

Answer: B. Basophils – 0.5–1%
Explanation: Basophils are the least abundant WBCs, correctly matched to 0.5–1% of total leukocytes.

Q5. The life span of RBCs in human blood is:

A. 120 hours
B. 12 days
C. 120 days
D. 12 months

Answer: C. 120 days
Explanation: Human RBCs have no nucleus or mitochondria, and live for ~120 days in circulation.

Q6. Which vitamin is essential for blood coagulation?

A. Vitamin B_{12}
B. Vitamin D
C. Vitamin K
D. Vitamin A

Answer: C. Vitamin K
Explanation: Vitamin K is needed to synthesize prothrombin and other clotting factors in the liver.

Q7. Universal donor blood group is:

A. AB+
B. O−
C. A−
D. B+

Answer: B. O−
Explanation: O− has no A/B antigens and no Rh factor, so it can be donated to any group in emergencies.

Q8. Bundle of His is a part of which of the following?

A. SA node
B. Cardiac output

C. Conducting system of heart
D. Vagal inhibition

Answer: C. Conducting system of heart
Explanation: The Bundle of His conducts impulses from the AV node to the ventricles for coordinated contraction.

Q9. What does a normal ECG (Electrocardiogram) represent?

A. Action potential of ventricles only
B. Sum of all action potentials in the heart
C. Cardiac output
D. SA node firing

Answer: B. Sum of all action potentials in the heart
Explanation: ECG shows the combined electrical activity of the heart, recorded over time.

Q10. Cardiac output in an average adult at rest is approximately:

A. 2 L/min
B. 3.5 L/min
C. 5 L/min
D. 10 L/min

Answer: C. 5 L/min
Explanation: Cardiac output = Heart rate × Stroke volume = ~72 bpm × 70 mL ≈ 5 L/min

Q11. Which of the following does not affect blood pressure?

A. Cardiac output
B. Vascular resistance
C. Blood volume
D. Vital capacity

Answer: D. Vital capacity
Explanation: Vital capacity is related to lung function, not directly to blood pressure regulation.

Q12. If a person's blood pressure reads 150/90 mmHg, the pulse pressure is:

A. 240 mmHg
B. 60 mmHg
C. 150 mmHg
D. 90 mmHg

Answer: B. 60 mmHg
Explanation: Pulse pressure = Systolic – Diastolic = 150 – 90 = 60 mmHg

Q13. The term double circulation refers to:

A. Blood circulating twice through the lungs
B. Blood circulating twice through the heart
C. Two types of blood in same vessel
D. Blood flowing through both arteries and veins

Answer: B. Blood circulating twice through the heart
Explanation: In double circulation, blood passes twice through the heart: once for lungs (pulmonary) and once for body (systemic).

Q14. During systole, which event occurs?

A. Semilunar valves close
B. AV valves open
C. Blood enters atria
D. Ventricles contract

Answer: D. Ventricles contract
Explanation: Systole refers to the ventricular contraction phase, pushing blood into aorta and pulmonary artery.

Q15. Bradycardia refers to:

A. Abnormally fast heartbeat
B. Normal sinus rhythm
C. Abnormally slow heartbeat
D. Increased blood pressure

Answer: C. Abnormally slow heartbeat
Explanation: Bradycardia is a heart rate below 60 bpm, opposite of tachycardia (>100 bpm).

Q16. The double circulation in humans means:

A. Blood passes twice through the heart in one cycle
B. Blood is oxygenated twice
C. Blood circulates twice in arteries
D. Heart has four chambers

Answer: A. Blood passes twice through the heart in one cycle
Explanation: In double circulation, blood flows through the heart twice: once for oxygenation (pulmonary) and once to supply the body (systemic).

Q17. Which component is not part of the human plasma?

A. Fibrinogen
B. Glucose
C. Albumin
D. Erythrocytes

Answer: D. Erythrocytes
Explanation: Plasma is the fluid part of blood without cells. RBCs (erythrocytes) are cellular components, not part of plasma.

Q18. Which blood group is considered the universal recipient and why?

A. O^+ because it lacks antigens
B. AB^+ because it lacks antibodies
C. AB^- because it lacks antibodies
D. O^- because it lacks Rh factor

Answer: B. AB^+ because it lacks antibodies
Explanation: Individuals with AB^+ blood lack both anti-A and anti-B antibodies, allowing them to receive blood from any group.

Q19. During systole of the left ventricle, which valve opens?

A. Tricuspid valve
B. Bicuspid (mitral) valve
C. Pulmonary semilunar valve
D. Aortic semilunar valve

Answer: D. Aortic semilunar valve
Explanation: When the left ventricle contracts, it pushes blood into the aorta through the aortic semilunar valve.

Q20. Match the components with their functions:

Component	Function
A. Neutrophils	1. Blood clotting
B. Lymphocytes	2. Immune response
C. Platelets	3. Phagocytosis

Options:
A. A-3, B-2, C-1
B. A-1, B-3, C-2
C. A-2, B-1, C-3
D. A-3, B-1, C-2

Answer: A. A-3, B-2, C-1
Explanation:

Neutrophils perform phagocytosis

Lymphocytes manage immune response

Platelets help in blood clotting

Q21. The sinoatrial (SA) node acts as the pacemaker because:

A. It contracts the fastest
B. It delays the impulse

C. It generates maximum pressure
D. It initiates and regulates heartbeat

Answer: D. It initiates and regulates heartbeat
Explanation: The SA node generates electrical impulses, making it the pacemaker of the heart.

Q22. Cardiac output is:

A. Stroke volume × Heart rate
B. Stroke volume / Heart rate
C. Total blood volume × Pulse
D. Heart rate − Pulse rate

Answer: A. Stroke volume × Heart rate
Explanation: Cardiac output is the volume of blood pumped by each ventricle per minute, calculated by multiplying stroke volume with heart rate.

Q23. Which of the following causes repolarization in cardiac muscles?

A. Influx of Na^+ ions
B. Outflux of K^+ ions
C. Influx of Ca^{2+} ions
D. Opening of Na^+ channels

Answer: B. Outflux of K^+ ions
Explanation: During repolarization, K^+ ions move out of cardiac muscle cells, restoring resting membrane potential.

Q24. Which is the correct path of blood flow?

A. Pulmonary vein → Right atrium → Right ventricle
B. Pulmonary artery → Left atrium → Left ventricle
C. Pulmonary vein → Left atrium → Left ventricle
D. Pulmonary artery → Right atrium → Left ventricle

Answer: C. Pulmonary vein → Left atrium → Left ventricle
Explanation: The pulmonary vein carries oxygenated blood from the lungs to the left atrium, then to the left ventricle.

Q25. Assertion (A): Pulmonary artery carries deoxygenated blood.

Reason (R): All arteries carry oxygenated blood.

A. A and R are true, R is correct explanation
B. A is true, R is false
C. A is false, R is true
D. Both A and R are false

Answer: B. A is true, R is false
Explanation: The pulmonary artery is an exception—it carries deoxygenated blood from heart to lungs. Thus, R is incorrect.

Q26. The QRS complex in ECG represents:

A. Atrial depolarization
B. Ventricular repolarization
C. Ventricular depolarization
D. Atrial repolarization

Answer: C. Ventricular depolarization
Explanation: The QRS complex corresponds to the depolarization of the ventricles, leading to ventricular contraction.

Q27. In the case of Rh incompatibility, the fetus may suffer from:

A. Atherosclerosis
B. Erythroblastosis fetalis
C. Thrombocytopenia
D. Leukemia

Answer: B. Erythroblastosis fetalis
Explanation: When an Rh^- mother carries an Rh^+ fetus, maternal antibodies may destroy fetal RBCs, causing erythroblastosis fetalis.

Q28. Which of the following blood vessels has the thickest muscular wall?

A. Artery
B. Vein
C. Capillary
D. Venule

Answer: A. Artery
Explanation: Arteries have the thickest walls to withstand high pressure of blood pumped from the heart.

Q29. The major function of lymph is to:

A. Supply oxygen to tissues
B. Remove urea from body
C. Transport hormones
D. Return proteins and fluid to blood

Answer: D. Return proteins and fluid to blood
Explanation: Lymph collects tissue fluid and proteins and returns them to blood circulation, playing a key role in fluid balance.

Q30. Bradycardia refers to:

A. Rapid heart rate
B. Irregular heartbeat
C. Low heart rate
D. Normal heart sound

Answer: C. Low heart rate
Explanation: Bradycardia is defined as slower than normal heart rate, usually below 60 bpm in adults.

Q31. What will happen if lymphatic vessels are blocked?

A. Immunity increases
B. Tissue dehydration
C. Accumulation of tissue fluid causing edema
D. Blood pressure decreases

Answer: C. Accumulation of tissue fluid causing edema

Explanation: Blockage of lymphatic vessels leads to improper drainage of interstitial fluid, causing edema (swelling).

Q32. Which statement about human heart is incorrect?

A. Left ventricle pumps blood into pulmonary artery
B. Right atrium receives deoxygenated blood
C. Tricuspid valve is between right atrium and right ventricle
D. Bicuspid valve is also called mitral valve

Answer: A. Left ventricle pumps blood into pulmonary artery
Explanation: Left ventricle pumps blood into aorta, not pulmonary artery. Pulmonary artery arises from right ventricle.

Q33. Which one is a granulocyte?

A. Basophil
B. Monocyte
C. Lymphocyte
D. Erythrocyte

Answer: A. Basophil
Explanation: Granulocytes include neutrophils, eosinophils, and basophils (they have granules in cytoplasm). Monocytes and lymphocytes are agranulocytes.

Q34. Which among the following has the least lifespan?

A. Neutrophils
B. RBCs
C. Platelets
D. Lymphocytes

Answer: A. Neutrophils
Explanation: Neutrophils are short-lived and survive for about 6–8 hours in blood.

Q35. In ECG, the T wave represents:

A. Atrial contraction
B. Ventricular depolarization
C. Ventricular repolarization
D. Atrial repolarization

Answer: C. Ventricular repolarization
Explanation: T wave reflects repolarization of ventricles, which prepares the ventricles for the next cycle.

Q36. Which condition causes narrowing of arteries due to fatty deposits?

A. Atherosclerosis
B. Hypertension
C. Angina
D. Arrhythmia

Answer: A. Atherosclerosis
Explanation: Atherosclerosis is the deposition of cholesterol and lipids inside arteries, leading to narrowing and reduced blood flow.

Q37. The main function of hemoglobin is:

A. Blood clotting
B. Immunity
C. Oxygen transport
D. Excretion

Answer: C. Oxygen transport
Explanation: Hemoglobin binds with O_2 and transports it from lungs to tissues.

Q38. Why is pulmonary circulation called low-pressure circulation?

A. Lungs are delicate
B. Pulmonary artery is large
C. Right ventricle is thick-walled
D. Pulmonary veins lack valves

Answer: A. Lungs are delicate

Explanation: Pulmonary circulation has lower pressure to prevent damage to delicate lung tissues and maintain efficient gas exchange.

Q39. Which one of the following will be most affected by hemorrhage?

A. WBC count
B. Pulse pressure
C. Heart rhythm
D. Lymph flow

Answer: B. Pulse pressure
Explanation: Hemorrhage leads to loss of blood volume, which reduces pulse pressure (difference between systolic and diastolic pressure).

Q40. Which component initiates blood clotting?

A. Heparin
B. Fibrin
C. Thrombokinase
D. Prothrombin

Answer: C. Thrombokinase
Explanation: Thrombokinase (thromboplastin) is released from damaged tissues and platelets, initiating the clotting cascade.

Q41. Which mineral is essential for blood coagulation?

A. Sodium
B. Calcium
C. Magnesium
D. Potassium

Answer: B. Calcium
Explanation: Ca^{2+} (calcium) ions are crucial cofactors in blood clotting reactions, especially for the conversion of prothrombin to thrombin.

Q42. Which blood vessel carries oxygenated blood from lungs to heart?

A. Pulmonary artery
B. Aorta
C. Pulmonary vein
D. Coronary artery

Answer: C. Pulmonary vein
Explanation: Pulmonary vein carries oxygen-rich blood from lungs to left atrium of heart.

Q43. Which statement is true about open circulatory system?

A. Found in annelids
B. Blood confined in vessels
C. Found in arthropods
D. Most efficient system

Answer: C. Found in arthropods
Explanation: Arthropods and mollusks have open circulatory system where blood (hemolymph) directly bathes organs.

Q44. The anti-coagulant present in blood is:

A. Fibrin
B. Heparin
C. Thrombin
D. Thromboplastin

Answer: B. Heparin
Explanation: Heparin is a natural anticoagulant produced by basophils and mast cells to prevent clot formation.

Q45. Which one of the following is a correct match?

A. Prothrombin – Dissolves clot
B. Eosinophils – Immunoglobulin production
C. Fibrin – Forms mesh in clot
D. Platelets – Oxygen transport

Answer: C. Fibrin – Forms mesh in clot

Explanation: Fibrin forms a meshwork that traps blood cells, leading to clot formation.