

Note

BLOOD VESSELS - BASIC RULES

- Arteries carry blood away from the heart; veins return blood toward the heart.
- Pulmonary vessels are named by direction, not by oxygen content.

Easy rule: Artery = Away. Vein = toward the heart.

Question 1

Which blood vessels carry blood away from the heart?

- ☐ a Veins
- ☐ b Arteries
- ☐ c Capillaries
- ☐ d Venules

Correct answer

☒ b Arteries

Question 2

Which blood vessels return blood to the heart?

- ☐ a Arteries
- ☐ b Capillaries
- ☐ c Veins
- ☐ d Arterioles

Correct answer

☒ c Veins

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Question 3

Which vessel carries oxygenated blood from the lungs to the heart?

- ☐ a Pulmonary artery
- ☐ b Pulmonary vein
- ☐ c Vena cava
- ☐ d Aorta

Correct answer

- ☒ b Pulmonary vein

Question 4

Which vessel carries oxygen-poor blood from the heart to the lungs?

- ☐ a Aorta
- ☐ b Pulmonary vein
- ☐ c Pulmonary artery
- ☐ d Vena cava

Correct answer

- ☒ c Pulmonary artery

Note

CAPILLARIES & BLOOD PRESSURE

- Capillaries are the thinnest blood vessels and are the main exchange vessels.
- Blood moves slowly through capillary beds, giving time for diffusion of gases, nutrients, and wastes.

Easy rule: Thin wall + slow flow = efficient exchange.

Question 5

Which are the thinnest blood vessels?

- ☐ a Arteries
- ☐ b Veins
- ☐ c Capillaries
- ☐ d Arterioles

Correct answer

☒ c Capillaries

Question 6

Where does most exchange of gases, nutrients, and wastes between blood and tissues occur?

- ☐ a Arteries
- ☐ b Capillaries
- ☐ c Veins
- ☐ d Aorta

Correct answer

☒ b Capillaries

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CAPILLARIES & BLOOD PRESSURE

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- Blood moves slowly through capillary beds, giving time for diffusion of gases, nutrients, and wastes.

Easy rule: Thin wall + slow flow = efficient exchange.

Question 7

In which blood vessels is blood flow slowest, allowing efficient exchange with tissues?

- ☐ a Arteries
- ☐ b Arterioles
- ☐ c Capillaries
- ☐ d Veins

Correct answer

☒ c Capillaries

Note

CAPILLARIES & BLOOD PRESSURE

- Arterial pressure is generally high because blood is pumped directly from the ventricles.
- Venous pressure is lower. Vessel names depend on flow direction, not oxygen level.

Easy rule: Direction tells you artery vs. vein.

Question 8

Blood pressure in arteries is generally:

- ☐ a High
- ☐ b Low
- ☐ c Zero
- ☐ d Equal to venous pressure

Correct answer

- ☒ a High

Question 9

Blood pressure in veins is generally:

- ☐ a High
- ☐ b Low
- ☐ c Higher than arterial pressure
- ☐ d Equal to aortic pressure

Correct answer

- ☒ b Low

Note

CAPILLARIES & BLOOD PRESSURE

- Arterial pressure is generally high because blood is pumped directly from the ventricles.
- Venous pressure is lower. Vessel names depend on flow direction, not oxygen level.

Easy rule: Direction tells you artery vs. vein.

Question 10

Whether a vessel is called an artery or a vein is determined mainly by:

- ☐ a The oxygen content of the blood
- ☐ b The direction of blood flow relative to the heart
- ☐ c The color of the blood
- ☐ d The amount of carbon dioxide present

Correct answer

- ☒ b The direction of blood flow relative to the heart

Note

CIRCULATORY CIRCUITS & LYMPHATICS

- The pulmonary circuit connects the heart and lungs.
- The systemic circuit connects the heart with the rest of the body.
- In a closed circulatory system, blood remains inside vessels.

Easy rule: Pulmonary = lungs. Systemic = body.

Question 11

The pulmonary circuit carries blood primarily:

- ☐ a From the heart to the lungs
- ☐ b From the heart to the rest of the body
- ☐ c From the liver to the heart
- ☐ d From the kidneys to the heart

Correct answer

- ☒ a From the heart to the lungs

Question 12

The systemic circuit carries blood primarily:

- ☐ a From the heart to the lungs
- ☐ b From the heart to the rest of the body
- ☐ c From the lungs to the left atrium only
- ☐ d From the vena cava to the right atrium only

Correct answer

- ☒ b From the heart to the rest of the body

Note

CIRCULATORY CIRCUITS & LYMPHATICS

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- The systemic circuit connects the heart with the rest of the body.
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Easy rule: Pulmonary = lungs. Systemic = body.

Question 13

A closed circulatory system is one in which:

- ☐ a Blood is always contained within vessels
- ☐ b Blood directly bathes all body tissues
- ☐ c Blood and interstitial fluid are the same fluid
- ☐ d The heart has no chambers

Correct answer

- ☒ a Blood is always contained within vessels

Note

CIRCULATORY CIRCUITS & LYMPHATICS

- Lymphatic vessels return excess tissue fluid to the bloodstream.
- Lymph nodes filter lymph before it returns to the venous circulation.

Easy rule: Lymph returns fluid; lymph nodes filter it.

Question 14

Which structures return excess tissue fluid to the bloodstream?

- ☐ a Arterioles
- ☐ b Lymphatic vessels
- ☐ c Coronary arteries
- ☐ d Pulmonary veins

Correct answer

- ☒ b Lymphatic vessels

Question 15

Which structures filter potentially harmful material from lymph before it returns to the blood?

- ☐ a Lymph nodes
- ☐ b Atria
- ☐ c Capillaries
- ☐ d Ventricles

Correct answer

- ☒ a Lymph nodes

Note

HEART CHAMBERS, VALVES & BLOOD FLOW

- The right side of the heart receives oxygen-poor blood and sends it to the lungs.
- The left atrium receives oxygen-rich blood from the lungs and passes it to the left ventricle.

Easy rule: Right side -> lungs. Left side -> body.

Question 16

Which chamber receives oxygen-poor blood returning from the systemic circulation?

- ☐ a Left atrium
- ☐ b Right atrium
- ☐ c Left ventricle
- ☐ d Right ventricle

Correct answer

- ☒ b Right atrium

Question 17

From the right atrium, blood passes immediately into the:

- ☐ a Left atrium
- ☐ b Left ventricle
- ☐ c Right ventricle
- ☐ d Pulmonary vein

Correct answer

- ☒ c Right ventricle

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HEART CHAMBERS, VALVES & BLOOD FLOW

- The right side of the heart receives oxygen-poor blood and sends it to the lungs.
- The left atrium receives oxygen-rich blood from the lungs and passes it to the left ventricle.

Easy rule: Right side -> lungs. Left side -> body.

Question 18

The right ventricle pumps blood directly into the:

- ☐ a Aorta
- ☐ b Pulmonary artery
- ☐ c Pulmonary vein
- ☐ d Vena cava

Correct answer

- ☒ b Pulmonary artery

Question 19

Pulmonary veins empty directly into the:

- ☐ a Right atrium
- ☐ b Right ventricle
- ☐ c Left atrium
- ☐ d Left ventricle

Correct answer

- ☒ c Left atrium

Note

HEART CHAMBERS, VALVES & BLOOD FLOW

- The right side of the heart receives oxygen-poor blood and sends it to the lungs.
- The left atrium receives oxygen-rich blood from the lungs and passes it to the left ventricle.

Easy rule: Right side -> lungs. Left side -> body.

Question 20

From the left atrium, blood passes into the:

- ☐ a Right atrium
- ☐ b Right ventricle
- ☐ c Left ventricle
- ☐ d Pulmonary artery

Correct answer

- ☒ c Left ventricle

Note

HEART CHAMBERS, VALVES & BLOOD FLOW

- The left ventricle has the strongest pumping role because it drives the systemic circulation.
- Normal flow: body → right atrium → right ventricle → lungs → left atrium → left ventricle → body.

Easy rule: Trace blood in one continuous loop.

Question 21

The left ventricle pumps blood directly into the:

- ☐ a Aorta
- ☐ b Pulmonary artery
- ☐ c Vena cava
- ☐ d Pulmonary vein

Correct answer

- ☒ a Aorta

Question 22

Which chamber pumps blood with the highest pressure?

- ☐ a Right atrium
- ☐ b Left atrium
- ☐ c Right ventricle
- ☐ d Left ventricle

Correct answer

- ☒ d Left ventricle

Note

HEART CHAMBERS, VALVES & BLOOD FLOW

- The left ventricle has the strongest pumping role because it drives the systemic circulation.
- Normal flow: body → right atrium → right ventricle → lungs → left atrium → left ventricle → body.

Easy rule: Trace blood in one continuous loop.

Question 23

Which statement about the left ventricle is correct?

- ☐ a It pumps blood to the lungs
- ☐ b It pumps blood to the systemic circulation
- ☐ c It receives blood from the vena cava
- ☐ d It receives blood directly from the right atrium

Correct answer

- ☒ b It pumps blood to the systemic circulation

Question 24

Which sequence correctly traces blood through the human heart and lungs?

- ☐ a Body → right atrium → right ventricle → lungs → left atrium → left ventricle → body
- ☐ b Body → left atrium → left ventricle → lungs → right atrium → right ventricle → body
- ☐ c Body → right ventricle → right atrium → lungs → left ventricle → left atrium → body
- ☐ d Body → left ventricle → left atrium → lungs → right ventricle → right atrium → body

Correct answer

- ☒ a Body → right atrium → right ventricle → lungs → left atrium → left ventricle → body

Note

HEART CHAMBERS, VALVES & BLOOD FLOW

- The aorta carries oxygen-rich blood away from the left ventricle; the venae cavae return oxygen-poor blood to the right atrium.
- Semilunar valves guard ventricular outflow; atrioventricular valves prevent backflow into the atria.

Easy rule: Valves keep blood moving one way.

Question 25

The aorta carries:

- ☐ a Oxygen-rich blood away from the heart
- ☐ b Oxygen-poor blood away from the heart
- ☐ c Oxygen-rich blood toward the heart
- ☐ d Oxygen-poor blood toward the heart

Correct answer

- ☒ a Oxygen-rich blood away from the heart

Question 26

The venae cavae carry:

- ☐ a Oxygen-rich blood away from the heart
- ☐ b Oxygen-poor blood toward the heart
- ☐ c Oxygen-rich blood toward the lungs
- ☐ d Oxygen-poor blood away from the heart

Correct answer

- ☒ b Oxygen-poor blood toward the heart

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HEART CHAMBERS, VALVES & BLOOD FLOW

- The aorta carries oxygen-rich blood away from the left ventricle; the venae cavae return oxygen-poor blood to the right atrium.
- Semilunar valves guard ventricular outflow; atrioventricular valves prevent backflow into the atria.

Easy rule: Valves keep blood moving one way.

Question 27

Which valves separate the ventricles from the arteries?

- ☐ a Atrioventricular valves
- ☐ b Semilunar valves
- ☐ c Venous valves
- ☐ d Lymphatic valves

Correct answer

- ☒ b Semilunar valves

Question 28

Which valves prevent blood from flowing back into the atria during ventricular contraction?

- ☐ a Semilunar valves
- ☐ b Atrioventricular valves
- ☐ c Venous valves
- ☐ d Lymphatic valves

Correct answer

- ☒ b Atrioventricular valves

Note

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- The aorta carries oxygen-rich blood away from the left ventricle; the venae cavae return oxygen-poor blood to the right atrium.
- Semilunar valves guard ventricular outflow; atrioventricular valves prevent backflow into the atria.

Easy rule: Valves keep blood moving one way.

Question 29

Which structure prevents blood from flowing back from the aorta into the left ventricle between heartbeats?

- ☐ a Aortic semilunar valve
- ☐ b Tricuspid valve
- ☐ c Mitral valve
- ☐ d Pulmonary vein

Correct answer

- ☒ a Aortic semilunar valve

Question 30

The first heart sound is produced mainly by closure of the:

- ☐ a Semilunar valves
- ☐ b Atrioventricular valves
- ☐ c Venous valves
- ☐ d Coronary arteries

Correct answer

- ☒ b Atrioventricular valves

Note

CARDIAC CONDUCTION & CARDIAC CYCLE

- The sinoatrial (SA) node is the normal pacemaker and starts each heartbeat in the right atrium.
- The atrioventricular (AV) node delays the impulse before ventricular activation. The QRS complex represents ventricular depolarization.

Easy rule: SA starts; AV delays; ventricles depolarize in QRS.

Question 31

The normal pacemaker of the human heart is the:

- ☐ a Atrioventricular node
- ☐ b Sinoatrial node
- ☐ c Bundle of His
- ☐ d Purkinje fibers

Correct answer

- ☒ b Sinoatrial node

Question 32

The electrical stimulus for a normal heartbeat begins in the:

- ☐ a Sinoatrial node in the right atrium
- ☐ b Atrioventricular node in the left atrium
- ☐ c Left ventricle
- ☐ d Aorta

Correct answer

- ☒ a Sinoatrial node in the right atrium

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- The atrioventricular (AV) node delays the impulse before ventricular activation. The QRS complex represents ventricular depolarization.

Easy rule: SA starts; AV delays; ventricles depolarize in QRS.

Question 33

A key role of the atrioventricular node is to:

- ☐ a Speed conduction from atria to ventricles
- ☐ b Delay conduction from atria to ventricles
- ☐ c Act as the main oxygen carrier
- ☐ d Prevent backflow from the aorta

Correct answer

- ☒ b Delay conduction from atria to ventricles

Question 34

The QRS complex on a normal ECG is associated mainly with:

- ☐ a Ventricular depolarization
- ☐ b Atrial repolarization only
- ☐ c Closure of the semilunar valves
- ☐ d Venous return

Correct answer

- ☒ a Ventricular depolarization

Note

CARDIAC CONDUCTION & CARDIAC CYCLE

- Diastole is the relaxation and filling phase of the heart.
- During ventricular systole, AV valves close and semilunar valves open so blood can leave the ventricles.

Easy rule: Diastole fills; systole ejects.

Question 35

What happens during diastole?

- ☐ a The heart muscle relaxes and the chambers fill
- ☐ b The ventricles contract and eject blood
- ☐ c Both atria and ventricles remain permanently contracted
- ☐ d Only the semilunar valves open while all chambers contract

Correct answer

- ☒ a The heart muscle relaxes and the chambers fill

Question 36

During ventricular systole, the semilunar valves are normally:

- ☐ a Open
- ☐ b Closed
- ☐ c Absent
- ☐ d Reversed

Correct answer

- ☒ a Open

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- During ventricular systole, AV valves close and semilunar valves open so blood can leave the ventricles.

Easy rule: Diastole fills; systole ejects.

Question 37

During ventricular systole, the atrioventricular valves are normally:

- ☐ a Open
- ☐ b Closed
- ☐ c Absent
- ☐ d Permanently relaxed

Correct answer

☒ b Closed

Question 38

Blood normally leaves the heart from the:

- ☐ a Atria
- ☐ b Ventricles
- ☐ c Venae cavae
- ☐ d Pulmonary veins

Correct answer

☒ b Ventricles

Note

BLOOD PRESSURE & FLOW CONTROL

- Systolic pressure is measured during ventricular contraction; diastolic pressure is measured between contractions.
- Vasodilation increases vessel diameter, while vasoconstriction decreases it and raises resistance.
- Skeletal muscles and venous valves help return blood to the heart.

Easy rule: Smaller vessel radius = greater resistance.

Question 39

A blood pressure reading of 115/75 mmHg means that:

- ☐ a 115 is systolic pressure and 75 is diastolic pressure
- ☐ b 75 is systolic pressure and 115 is diastolic pressure
- ☐ c Both values are venous pressures
- ☐ d Both values are capillary pressures

Correct answer

- ☒ a 115 is systolic pressure and 75 is diastolic pressure

Question 40

Vasodilation means:

- ☐ a A decrease in arteriole diameter
- ☐ b An increase in arteriole diameter
- ☐ c Closure of venous valves
- ☐ d Thickening of capillary walls

Correct answer

- ☒ b An increase in arteriole diameter

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- Systolic pressure is measured during ventricular contraction; diastolic pressure is measured between contractions.
- Vasodilation increases vessel diameter, while vasoconstriction decreases it and raises resistance.
- Skeletal muscles and venous valves help return blood to the heart.

Easy rule: Smaller vessel radius = greater resistance.

Question 41

Vasoconstriction means:

- ☐ a An increase in vessel diameter
- ☐ b A decrease in vessel diameter
- ☐ c Complete loss of smooth muscle
- ☐ d Opening of heart valves

Correct answer

- ☒ b A decrease in vessel diameter

Question 42

If the diameter of an arteriole decreases markedly, resistance to blood flow will:

- ☐ a Increase
- ☐ b Decrease
- ☐ c Remain unchanged
- ☐ d Become zero

Correct answer

- ☒ a Increase

Note

BLOOD PRESSURE & FLOW CONTROL

- Systolic pressure is measured during ventricular contraction; diastolic pressure is measured between contractions.
- Vasodilation increases vessel diameter, while vasoconstriction decreases it and raises resistance.
- Skeletal muscles and venous valves help return blood to the heart.

Easy rule: Smaller vessel radius = greater resistance.

Question 43

Which mechanism helps return venous blood to the heart, especially from the limbs?

- ☐ a Skeletal muscle contraction compressing veins
- ☐ b Diffusion through arterial walls
- ☐ c Red blood cell division
- ☐ d Closure of the aortic valve

Correct answer

- ☒ a Skeletal muscle contraction compressing veins

Question 44

Why are valves important in veins?

- ☐ a They ensure one-way blood flow toward the heart
- ☐ b They increase oxygen production
- ☐ c They convert veins into arteries
- ☐ d They form red blood cells

Correct answer

- ☒ a They ensure one-way blood flow toward the heart

Note

BLOOD PRESSURE & FLOW CONTROL

- Systolic pressure is measured during ventricular contraction; diastolic pressure is measured between contractions.
- Vasodilation increases vessel diameter, while vasoconstriction decreases it and raises resistance.
- Skeletal muscles and venous valves help return blood to the heart.

Easy rule: Smaller vessel radius = greater resistance.

Question 45

Compared with veins of similar size, arteries generally have:

- ☒ a Thicker muscular walls
- ☐ b Thinner walls
- ☐ c More valves
- ☐ d Lower pressure

Correct answer

- ☒ a Thicker muscular walls

Note

BLOOD CELLS

- Hematocrit represents the fraction of blood volume occupied by red blood cells.
- Mature human erythrocytes lack a nucleus, are produced in red bone marrow, and survive about 120 days.
- Hemoglobin contains iron and carries oxygen.

Easy rule: RBC = oxygen transport; hemoglobin = iron-containing carrier.

Question 46

The hematocrit is a measure of the volume occupied by:

- ☐ a Plasma
- ☐ b Red blood cells
- ☐ c White blood cells
- ☐ d Platelets

Correct answer

- ☒ b Red blood cells

Question 47

The most critical function of erythrocytes is:

- ☐ a Transport of oxygen
- ☐ b Production of antibodies
- ☐ c Formation of fibrin
- ☐ d Regulation of heart rhythm

Correct answer

- ☒ a Transport of oxygen

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Question 48

Mature human red blood cells are normally:

- ☐ a Nucleated
- ☐ b Non-nucleated
- ☐ c Multinucleated
- ☐ d Filled with mitochondria

Correct answer

- ☒ b Non-nucleated

Question 49

New red blood cells are produced primarily in the:

- ☐ a Red bone marrow
- ☐ b Adult spleen
- ☐ c Pancreas
- ☐ d Lungs

Correct answer

- ☒ a Red bone marrow

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BLOOD CELLS

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- Mature human erythrocytes lack a nucleus, are produced in red bone marrow, and survive about 120 days.
- Hemoglobin contains iron and carries oxygen.

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Question 50

A typical human red blood cell survives for approximately:

- ☐ a 12 days
- ☐ b 30 days
- ☐ c 120 days
- ☐ d 365 days

Correct answer

☒ c 120 days

Question 51

Hemoglobin is especially important because it:

- ☐ a Carries oxygen
- ☐ b Produces platelets
- ☐ c Makes antibodies
- ☐ d Initiates nerve impulses

Correct answer

☒ a Carries oxygen

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BLOOD CELLS

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- Mature human erythrocytes lack a nucleus, are produced in red bone marrow, and survive about 120 days.
- Hemoglobin contains iron and carries oxygen.

Easy rule: RBC = oxygen transport; hemoglobin = iron-containing carrier.

Question 52

The metal atom in the heme group of hemoglobin is:

- ☐ a Calcium
- ☐ b Iron
- ☐ c Sodium
- ☐ d Copper

Correct answer

☒ b Iron

Note

BLOOD CELLS

- White blood cells defend the body and some can phagocytose foreign material.
- Platelets are cell fragments that play a major role in blood clotting.

Easy rule: WBC = defense. Platelets = clotting.

Question 53

Which blood cells are primarily responsible for fighting infection?

- ☐ a Red blood cells
- ☐ b White blood cells
- ☐ c Platelets
- ☐ d Fibrin

Correct answer

- ☒ b White blood cells

Question 54

Which blood cells can phagocytose foreign material?

- ☐ a White blood cells
- ☐ b Red blood cells
- ☐ c Platelets
- ☐ d Erythrocytes only

Correct answer

- ☒ a White blood cells

Note

BLOOD CELLS

- White blood cells defend the body and some can phagocytose foreign material.
- Platelets are cell fragments that play a major role in blood clotting.

Easy rule: WBC = defense. Platelets = clotting.

Question 55

Which blood component is most directly involved in clot formation?

- ☐ a Platelets
- ☐ b Red blood cells
- ☐ c Hemoglobin
- ☐ d Plasma water

Correct answer

☒ a Platelets

Note

BLOOD CLOTTING

- During clotting, fibrinogen is converted into fibrin, which forms a mesh that stabilizes the clot.
- Platelets, calcium ions, and clotting factors such as thromboplastin participate in coagulation.

Easy rule: Fibrin forms the clot mesh.

Question 56

The meshwork that forms the main fabric of a blood clot is made mostly of:

- ☐ a Fibrin
- ☐ b Fibrinogen
- ☐ c Hemoglobin
- ☐ d Albumin

Correct answer

- ☒ a Fibrin

Question 57

Fibrinogen is best described as:

- ☐ a A precursor that is converted into fibrin during clotting
- ☐ b The oxygen-carrying pigment of red blood cells
- ☐ c A white blood cell
- ☐ d A heart valve protein

Correct answer

- ☒ a A precursor that is converted into fibrin during clotting

Note

BLOOD CLOTTING

- During clotting, fibrinogen is converted into fibrin, which forms a mesh that stabilizes the clot.
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Easy rule: Fibrin forms the clot mesh.

Question 58

The major component of blood plasma is:

- ☐ a Water
- ☐ b Red blood cells
- ☐ c Platelets
- ☐ d Fibrin

Correct answer

- ☒ a Water

Question 59

Which of the following is NOT a normal component of plasma itself?

- ☐ a Water
- ☐ b Nutrients
- ☐ c Dissolved gases
- ☐ d Red blood cells

Correct answer

- ☒ d Red blood cells

Note

BLOOD CLOTTING

- During clotting, fibrinogen is converted into fibrin, which forms a mesh that stabilizes the clot.
- Platelets, calcium ions, and clotting factors such as thromboplastin participate in coagulation.

Easy rule: Fibrin forms the clot mesh.

Question 60

Platelets are best described as:

- ☐ a Cell fragments involved in clotting
- ☐ b Mature red blood cells
- ☐ c Antibody-producing cells
- ☐ d Pacemaker cells

Correct answer

- ☒ a Cell fragments involved in clotting

Question 61

Which blood component is NOT a primary participant in the clotting mechanism?

- ☐ a Fibrinogen
- ☐ b Calcium ions
- ☐ c Platelets
- ☐ d Erythrocytes

Correct answer

- ☒ d Erythrocytes

Note

BLOOD CLOTTING

- During clotting, fibrinogen is converted into fibrin, which forms a mesh that stabilizes the clot.
- Platelets, calcium ions, and clotting factors such as thromboplastin participate in coagulation.

Easy rule: Fibrin forms the clot mesh.

Question 62

Thromboplastin is associated with:

- ☐ a Blood clotting
- ☐ b Oxygen transport
- ☐ c Antibody production
- ☐ d Cardiac pacemaking

Correct answer

- ☒ a Blood clotting

Question 63

Calcium ions are important in:

- ☐ a Blood clotting
- ☐ b Oxygen binding to hemoglobin
- ☐ c Formation of lymph
- ☐ d Production of bile

Correct answer

- ☒ a Blood clotting

Note

PLASMA, FLUID BALANCE & VESSEL STRUCTURE

- Plasma is the liquid portion of blood and is mainly water.
- Red blood cells carry oxygen as oxyhemoglobin.
- Capillary pressure filters fluid into tissues; the lymphatic system returns excess fluid to blood.

Easy rule: Plasma carries dissolved materials; lymph returns excess tissue fluid.

Question 64

Which statement about white blood cells is correct?

- ☐ a They are involved in defense against disease
- ☐ b They are the main oxygen carriers
- ☐ c They are responsible for the first heart sound
- ☐ d They form the aortic valve

Correct answer

- ☒ a They are involved in defense against disease

Question 65

The liquid portion of blood is called:

- ☐ a Plasma
- ☐ b Lymph node
- ☐ c Fibrin
- ☐ d Hematocrit

Correct answer

- ☒ a Plasma

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Question 66

Red blood cells carry oxygen mainly in the form of:

- ☐ a Oxyhemoglobin
- ☐ b Fibrin
- ☐ c Thromboplastin
- ☐ d Bicarbonate

Correct answer

- ☒ a Oxyhemoglobin

Question 67

An abnormally high number of erythrocytes may make blood:

- ☐ a More difficult to flow
- ☐ b Unable to clot
- ☐ c Free of plasma
- ☐ d Unable to carry oxygen

Correct answer

- ☒ a More difficult to flow

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Question 68

If one essential protein in the clotting cascade becomes nonfunctional, the most likely result is:

- ☐ a Clot formation may fail
- ☐ b Oxygen transport increases
- ☐ c Heart rate stops permanently
- ☐ d Capillary exchange doubles

Correct answer

- ☒ a Clot formation may fail

Question 69

At the arteriolar end of a capillary, fluid tends to move out mainly because:

- ☐ a Blood pressure favors filtration outward
- ☐ b Venous valves force plasma outward
- ☐ c Red blood cells actively pump water
- ☐ d The lymphatic system raises capillary pressure

Correct answer

- ☒ a Blood pressure favors filtration outward

Note

PLASMA, FLUID BALANCE & VESSEL STRUCTURE

- Plasma is the liquid portion of blood and is mainly water.
- Red blood cells carry oxygen as oxyhemoglobin.
- Capillary pressure filters fluid into tissues; the lymphatic system returns excess fluid to blood.

Easy rule: Plasma carries dissolved materials; lymph returns excess tissue fluid.

Question 70

Fluid that accumulates in tissues is returned to the bloodstream mainly by the:

- ☐ a Lymphatic system
- ☐ b Digestive system
- ☐ c Endocrine system
- ☐ d Skeletal system

Correct answer

- ☒ a Lymphatic system

Note

PLASMA, FLUID BALANCE & VESSEL STRUCTURE

- Low-pressure veins and lymphatic vessels use valves and nearby skeletal muscle contractions to promote one-way flow.
- Arteries have thick muscular walls. The inner lining of blood vessels is the endothelium.

Easy rule: Arteries are thick; veins rely more on valves and muscle pumps.

Question 71

Lymphatic vessels normally contain:

- ☐ a Valves
- ☐ b Semilunar heart valves
- ☐ c No one-way structures
- ☐ d Only arterial blood

Correct answer

☒ a Valves

Question 72

Blood and lymph are helped through low-pressure vessels when nearby ____ contract.

- ☐ a Skeletal muscles
- ☐ b Hepatocytes
- ☐ c Alveoli
- ☐ d Red blood cells

Correct answer

☒ a Skeletal muscles

Note

PLASMA, FLUID BALANCE & VESSEL STRUCTURE

- Low-pressure veins and lymphatic vessels use valves and nearby skeletal muscle contractions to promote one-way flow.
- Arteries have thick muscular walls. The inner lining of blood vessels is the endothelium.

Easy rule: Arteries are thick; veins rely more on valves and muscle pumps.

Question 73

The walls of arteries contain mainly which type of muscle under involuntary control?

- ☐ a Smooth muscle
- ☐ b Skeletal muscle
- ☐ c Cardiac muscle
- ☐ d No muscle

Correct answer

- ☒ a Smooth muscle

Question 74

The inner lining of the circulatory system is called:

- ☐ a Endothelium
- ☐ b Epidermis
- ☐ c Pericardium
- ☐ d Myelin

Correct answer

- ☒ a Endothelium

Note

PLASMA, FLUID BALANCE & VESSEL STRUCTURE

- Low-pressure veins and lymphatic vessels use valves and nearby skeletal muscle contractions to promote one-way flow.
- Arteries have thick muscular walls. The inner lining of blood vessels is the endothelium.

Easy rule: Arteries are thick; veins rely more on valves and muscle pumps.

Question 75

Which statement about arteries is correct?

- ☐ a They have thick muscular walls
- ☐ b They normally have numerous valves along their length
- ☐ c They always carry oxygenated blood
- ☐ d They always carry blood toward the heart

Correct answer

- ☒ a They have thick muscular walls

Note

CARDIOVASCULAR DISORDERS

- Atherosclerosis is the buildup of plaque in blood vessels.
- Hypertension is associated with factors such as obesity, smoking, age, and kidney disease.
- Myocardial infarction (MI) is a heart attack caused by loss of blood supply to heart muscle.

Easy rule: Plaque can reduce coronary blood flow.

Question 76

Atherosclerosis results mainly from:

- ☐ a Accumulation of plaque in blood vessels
- ☐ b Excessive formation of red blood cells only
- ☐ c Failure of lymph nodes to filter lymph
- ☐ d Complete absence of venous valves

Correct answer

- ☒ a Accumulation of plaque in blood vessels

Question 77

Hypertension is associated with factors including:

- ☐ a Obesity, smoking, age, and kidney disease
- ☐ b Only low oxygen levels
- ☐ c Only low heart rate
- ☐ d Increased venous valves

Correct answer

- ☒ a Obesity, smoking, age, and kidney disease

Note

CARDIOVASCULAR DISORDERS

- Atherosclerosis is the buildup of plaque in blood vessels.
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- Myocardial infarction (MI) is a heart attack caused by loss of blood supply to heart muscle.

Easy rule: Plaque can reduce coronary blood flow.

Question 78

In cardiovascular disease, MI refers to:

- ☐ a Myocardial infarction (heart attack)
- ☐ b Mitral insufficiency only
- ☐ c Muscle inflammation
- ☐ d Microvascular infection

Correct answer

- ☒ a Myocardial infarction (heart attack)

Question 79

A heart attack most directly involves blockage of:

- ☐ a Arteries supplying the heart muscle
- ☐ b Veins supplying the brain
- ☐ c Pulmonary veins only
- ☐ d Lymphatic vessels

Correct answer

- ☒ a Arteries supplying the heart muscle

Note

GAS TRANSPORT & EXCHANGE

- Most carbon dioxide is transported in blood as bicarbonate ions in plasma.
- Lower blood pH decreases hemoglobin's affinity for oxygen (Bohr effect).
- Gas exchange occurs across alveoli and capillaries by diffusion.

Easy rule: CO₂ → bicarbonate; low pH helps unload oxygen.

Question 80

Most carbon dioxide produced by body cells is transported to the lungs mainly as:

- ☐ a Bicarbonate ions in plasma
- ☐ b Oxygen bound to hemoglobin
- ☐ c Fibrin in plasma
- ☐ d Platelets

Correct answer

- ☒ a Bicarbonate ions in plasma

Question 81

The Bohr effect on the oxyhemoglobin dissociation curve is produced directly by changes in:

- ☐ a pH
- ☐ b Platelet count
- ☐ c Hematocrit only
- ☐ d Venous valves

Correct answer

- ☒ a pH

Note

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- Gas exchange occurs across alveoli and capillaries by diffusion.

Easy rule: CO₂ → bicarbonate; low pH helps unload oxygen.

Question 82

When blood pH decreases, hemoglobin's affinity for oxygen generally:

- ☐ a Decreases
- ☐ b Increases
- ☐ c Remains completely unchanged
- ☐ d Becomes zero immediately

Correct answer

- ☒ a Decreases

Question 83

Which statement about hemoglobin is correct?

- ☐ a It is a large protein with four subunits
- ☐ b It is a carbohydrate on platelet surfaces
- ☐ c It contains no metal atom
- ☐ d It is produced by lymph nodes

Correct answer

- ☒ a It is a large protein with four subunits

Note

GAS TRANSPORT & EXCHANGE

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- Gas exchange occurs across alveoli and capillaries by diffusion.

Easy rule: CO₂ → bicarbonate; low pH helps unload oxygen.

Question 84

One hemoglobin molecule can bind up to:

- ☐ a Four oxygen molecules
- ☐ b One oxygen molecule
- ☐ c Two oxygen molecules
- ☐ d Eight oxygen molecules

Correct answer

- ☒ a Four oxygen molecules

Question 85

Which respiratory structure forms the main interface with the circulatory system for gas exchange?

- ☐ a Alveoli
- ☐ b Trachea
- ☐ c Pharynx
- ☐ d Larynx

Correct answer

- ☒ a Alveoli

Note

GAS TRANSPORT & EXCHANGE

- Most carbon dioxide is transported in blood as bicarbonate ions in plasma.
- Lower blood pH decreases hemoglobin's affinity for oxygen (Bohr effect).
- Gas exchange occurs across alveoli and capillaries by diffusion.

Easy rule: CO₂ → bicarbonate; low pH helps unload oxygen.

Question 86

In the alveoli, oxygen normally:

- ☐ a Diffuses into the blood while carbon dioxide diffuses out
- ☐ b Diffuses out of the blood while carbon dioxide diffuses in
- ☐ c Does not cross into blood
- ☐ d Is actively pumped into red blood cells

Correct answer

- ☒ a Diffuses into the blood while carbon dioxide diffuses out

Question 87

Gas exchange between alveoli and blood occurs mainly by:

- ☐ a Diffusion from higher to lower concentration
- ☐ b Active transport
- ☐ c Osmosis
- ☐ d Muscle contraction

Correct answer

- ☒ a Diffusion from higher to lower concentration

Note

GAS TRANSPORT & EXCHANGE

- Most carbon dioxide is transported in blood as bicarbonate ions in plasma.
- Lower blood pH decreases hemoglobin's affinity for oxygen (Bohr effect).
- Gas exchange occurs across alveoli and capillaries by diffusion.

Easy rule: CO₂ → bicarbonate; low pH helps unload oxygen.

Question 88

Which vessels are the principal site of gas exchange between blood and tissues?

- ☒ a Capillaries
- ☐ b Arteries
- ☐ c Veins
- ☐ d Venae cavae

Correct answer

- ☒ a Capillaries

Note

BLOOD GROUPS

- ABO blood groups depend on A and B antigens on red blood cell surfaces.
- Type A has A antigen; type AB has both A and B antigens.
- In incompatible transfusion, recipient antibodies can react with donor red-cell antigens.

Easy rule: Match donor red-cell antigens with recipient antibodies.

Question 89

ABO blood groups are determined mainly by:

- ☐ a Carbohydrates on the surface of red blood cells
- ☐ b Proteins inside white blood cells
- ☐ c Platelet count
- ☐ d Plasma water content

Correct answer

- ☒ a Carbohydrates on the surface of red blood cells

Question 90

A person with blood type A has:

- ☐ a A antigens on red blood cells
- ☐ b A antibodies on red blood cells
- ☐ c No antigens on red blood cells
- ☐ d B antigens on red blood cells

Correct answer

- ☒ a A antigens on red blood cells

Note

BLOOD GROUPS

- ABO blood groups depend on A and B antigens on red blood cell surfaces.
- Type A has A antigen; type AB has both A and B antigens.
- In incompatible transfusion, recipient antibodies can react with donor red-cell antigens.

Easy rule: Match donor red-cell antigens with recipient antibodies.

Question 91

A person with blood type AB has:

- ☐ a Both A and B antigens on red blood cells
- ☐ b No antigens on red blood cells
- ☐ c Only A antigens
- ☐ d Only B antigens

Correct answer

- ☒ a Both A and B antigens on red blood cells

Question 92

Which transfusion is considered safe in the supplied question set?

- ☐ a Type O donor to type AB recipient
- ☐ b Type A donor to type B recipient
- ☐ c Type B donor to type A recipient
- ☐ d Type AB donor to type O recipient

Correct answer

- ☒ a Type O donor to type AB recipient

Note

BLOOD GROUPS

- ABO blood groups depend on A and B antigens on red blood cell surfaces.
- Type A has A antigen; type AB has both A and B antigens.
- In incompatible transfusion, recipient antibodies can react with donor red-cell antigens.

Easy rule: Match donor red-cell antigens with recipient antibodies.

Question 93

Blood type AB is commonly described as the:

- ☐ a Universal recipient
- ☐ b Universal donor
- ☐ c Only recessive blood type
- ☐ d Only blood type without antigens

Correct answer

- ☒ a Universal recipient

Question 94

Which statement about ABO inheritance is correct?

- ☐ a A and B are dominant over O
- ☐ b O is dominant over both A and B
- ☐ c A is dominant over B
- ☐ d B is dominant over A

Correct answer

- ☒ a A and B are dominant over O

Note

BLOOD GROUPS

- ABO blood groups depend on A and B antigens on red blood cell surfaces.
- Type A has A antigen; type AB has both A and B antigens.
- In incompatible transfusion, recipient antibodies can react with donor red-cell antigens.

Easy rule: Match donor red-cell antigens with recipient antibodies.

Question 95

A major danger in an incompatible transfusion occurs when:

- ☐ a Recipient antibodies react with donor red-cell antigens
- ☐ b Donor red cells contain too much oxygen
- ☐ c Recipient platelets are too numerous
- ☐ d Donor plasma contains water

Correct answer

- ☒ a Recipient antibodies react with donor red-cell antigens

Note

FINAL INTEGRATION

- Heart valves maintain one-way flow, and humans have a closed circulatory system.
- The cardiovascular system includes the heart, blood vessels, and blood.
- Pulmonary veins are veins because they carry blood toward the heart; coronary artery blockage can cause a heart attack.

Easy rule: Name vessels by direction; protect coronary blood flow.

Question 96

Which structure ensures one-way flow of blood through the heart?

- ☐ a Valves
- ☐ b Atria
- ☐ c Septum
- ☐ d Capillaries

Correct answer

- ☒ a Valves

Question 97

Which statement about the human circulatory system is true?

- ☐ a Humans have a closed circulatory system
- ☐ b Humans have an open circulatory system
- ☐ c Arteries always carry oxygen-rich blood
- ☐ d Veins always carry oxygen-poor blood

Correct answer

- ☒ a Humans have a closed circulatory system

Note

FINAL INTEGRATION

- Heart valves maintain one-way flow, and humans have a closed circulatory system.
- The cardiovascular system includes the heart, blood vessels, and blood.
- Pulmonary veins are veins because they carry blood toward the heart; coronary artery blockage can cause a heart attack.

Easy rule: Name vessels by direction; protect coronary blood flow.

Question 98

Which statement best describes the cardiovascular system?

- ☐ a It includes the heart, blood vessels, and blood
- ☐ b It includes only the heart and lungs
- ☐ c It includes only blood vessels
- ☐ d It includes the heart and kidneys only

Correct answer

- ☒ a It includes the heart, blood vessels, and blood

Question 99

Why is the pulmonary vein still classified as a vein even though it carries oxygen-rich blood?

- ☐ a Because veins are defined by carrying blood toward the heart
- ☐ b Because all veins carry oxygen-rich blood
- ☐ c Because pulmonary vessels have no direction of flow
- ☐ d Because it contains valves only

Correct answer

- ☒ a Because veins are defined by carrying blood toward the heart

Note

FINAL INTEGRATION

- Heart valves maintain one-way flow, and humans have a closed circulatory system.
- The cardiovascular system includes the heart, blood vessels, and blood.
- Pulmonary veins are veins because they carry blood toward the heart; coronary artery blockage can cause a heart attack.

Easy rule: Name vessels by direction; protect coronary blood flow.

Question 100

Blockage of which vessels most directly causes a typical heart attack?

- ☐ a Coronary arteries supplying the heart muscle
- ☐ b Pulmonary veins
- ☐ c Venae cavae
- ☐ d Lymphatic vessels

Correct answer

- ☒ a Coronary arteries supplying the heart muscle