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Biology Grade 12 — Chapter 2

Blood Circulatory System of Man

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Independent practice MCQs from the supplied Class 12 Biology notes pack. Total: 50 questions.

A. Important / Main Topics

1. The heart is located within the:

(A) Mediastinum
(B) Pericardium
(C) Pleural cavity
(D) Abdominal cavity

Correct Answer: A

Explanation: The heart is within the mediastinum, which is bordered laterally by the lungs, posteriorly by the backbone and anteriorly by the sternum.

2. The pericardium is a:

(A) Muscular layer of the heart
(B) Closed sac that surrounds the heart
(C) Valve between atria and ventricles
(D) Blood vessel supplying the heart

Correct Answer: B

Explanation: The pericardium is a closed sac that surrounds the heart and is a fibrous membrane found as an external covering around the heart.

3. How many chambers does the human heart have?

(A) Two
(B) Three
(C) Four
(D) Five

Correct Answer: C

Explanation: Four — this correctly answers the question.

4. Which chamber of the heart has the thickest wall?

(A) Right atrium
(B) Left atrium
(C) Right ventricle
(D) Left ventricle

Correct Answer: D

Explanation: The left ventricle has to pump blood around the whole body, so it has the thickest wall.

5. The valve between the right atrium and right ventricle is the:

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

Correct Answer: A

Explanation: The atrioventricular valve between the right atrium and the right ventricle has three cusps and is called the tricuspid valve.

6. The systemic circulation carries blood:

(A) From the heart to the lungs
(B) From the heart to the body tissues

(C) From the lungs to the heart
(D) From the body tissues to the lungs

Correct Answer: B

Explanation: Systemic circulation carries oxygenated blood from the left ventricle to the body tissues and returns deoxygenated blood to the right atrium.

7. The pacemaker of the heart is the:

(A) AV node
(B) Bundle of His
(C) SA node
(D) Purkinje fibers

Correct Answer: C

Explanation: The SA node is called the pacemaker of the heart because it initiates the heartbeat.

8. The normal cardiac cycle lasts about:

(A) 0.3 to 0.4 seconds
(B) 1.0 to 1.2 seconds
(C) 1.5 to 2.0 seconds
(D) 0.7 to 0.8 seconds

Correct Answer: D

Explanation: The normal cardiac cycle is of 0.7 to 0.8 second depending on the capability of cardiac muscle to contract.

9. The P wave of an ECG represents:

(A) Atrial depolarization
(B) Ventricular depolarization
(C) Ventricular repolarization
(D) Atrial repolarization

Correct Answer: A

Explanation: The P wave of an ECG represents Atrial depolarization.

10. Which blood vessels carry blood away from the heart?

(A) Veins
(B) Arteries
(C) Capillaries
(D) Venules

Correct Answer: B

Explanation: Arteries carry blood away from the heart.

11. The smallest blood vessels are:

(A) Arteries
(B) Veins
(C) Capillaries
(D) Arterioles

Correct Answer: C

Explanation: Capillaries are the smallest blood vessels, ranging from 7 to 9 μm in diameter.

12. The normal blood pressure is:

(A) 100/60 mmHg
(B) 140/90 mmHg
(C) 160/100 mmHg
(D) 120/80 mmHg

Correct Answer: D

Explanation: 120/80 mmHg is normal blood pressure.

13. Hypertension is defined as blood pressure higher than:

(A) 140/90 mmHg
(B) 120/80 mmHg
(C) 130/85 mmHg
(D) 150/95 mmHg

Correct Answer: A

Explanation: Hypertension is defined as blood pressure higher than 140/90 mmHg.

14. The fluid that enters the lymphatic capillaries is called:

(A) Plasma
(B) Lymph
(C) Interstitial fluid
(D) Cerebrospinal fluid

Correct Answer: B

Explanation: The tissue fluid that has entered the lymphatic capillaries is called lymph.

15. The largest gland in the body is the:

(A) Pancreas
(B) Thyroid
(C) Liver
(D) Salivary gland

Correct Answer: C

Explanation: The liver is the largest gland in the body.

16. What is the function of the chordae tendineae?

(A) To open the semilunar valves
(B) To close the semilunar valves
(C) To generate action potentials
(D) To prevent AV valves from opening into the atria

Correct Answer: D

Explanation: The papillary muscles contract when the ventricles contract and prevent the valves from opening into the atria by pulling on the chordae tendineae attached to the valve cusps.

17. During ventricular systole, which valves are open?

(A) Semilunar valves
(B) Tricuspid and bicuspid valves
(C) Both AV and semilunar valves
(D) Neither AV nor semilunar valves

Correct Answer: A

Explanation: Semilunar valves — this correctly answers the question.

18. What causes the first heart sound ("lub")?

(A) Closure of semilunar valves
(B) Closure of atrioventricular valves
(C) Opening of atrioventricular valves
(D) Opening of semilunar valves

Correct Answer: B

Explanation: The first heart sound is caused by vibration of the atrioventricular valves which close near the beginning of ventricular systole.

19. What is the function of the AV node?

(A) To initiate the heartbeat
(B) To conduct impulses to the ventricles
(C) To relay the impulse and delay it
(D) To produce action potentials at a faster rate

Correct Answer: C

Explanation: The AV node receives the impulse from the SA node and delays it by 0.11 seconds, allowing the atria to contract before the ventricles.

20. What is the significance of the delay in the AV node?

(A) It allows the ventricles to contract before the atria
(B) It prevents the SA node from firing
(C) It speeds up the heart rate
(D) It allows the atria to contract before the ventricles

Correct Answer: D

Explanation: It allows the atria to contract before the ventricles — this correctly answers the question.

21. What does the QRS complex of an ECG represent?

(A) Ventricular depolarization
(B) Atrial depolarization
(C) Ventricular repolarization
(D) Atrial repolarization

Correct Answer: A

Explanation: Ventricular depolarization — this correctly answers the question.

22. What is the normal duration of the P-R interval?

(A) 0.04–0.08 sec
(B) 0.12–0.20 sec
(C) 0.4–0.43 sec
(D) 0.6–1.0 sec

Correct Answer: B

Explanation: The normal P-R interval is 0.12–0.20 sec.

23. Which layer of the artery contains smooth muscle?

(A) Tunica adventitia
(B) Tunica intima
(C) Tunica media
(D) Endothelium

Correct Answer: C

Explanation: The tunica media is the middle layer and contains a variable amount of elastic fibers and circular smooth muscle cells.

24. What is the function of valves in veins?

(A) To increase blood pressure
(B) To filter blood
(C) To produce blood cells
(D) To prevent backflow of blood

Correct Answer: D

Explanation: Veins having diameters greater than 2 mm contain valves that allow blood flow toward the heart but not in the opposite direction.

25. Vasoconstriction is caused by:

(A) Contraction of smooth muscle
(B) Relaxation of smooth muscle
(C) Dilation of blood vessels
(D) Increased blood flow

Correct Answer: A

Explanation: Vasoconstriction is a decrease in blood vessel diameter caused by smooth muscle contraction.

B. Less Important / Secondary Topics

26. Which hormone is a powerful vasoconstrictor?

(A) Norepinephrine
(B) Histamine
(C) Acetylcholine
(D) Insulin

Correct Answer: A

Explanation: Norepinephrine is an especially powerful vasoconstriction hormone.

27. What is the function of pre-capillary sphincters?

(A) To produce blood cells
(B) To regulate blood flow into capillaries
(C) To filter blood
(D) To increase heart rate

Correct Answer: B

Explanation: Pre-capillary sphincters can open and close the entrance to the capillary, regulating blood flow into the capillary bed.

28. Why does blood flow slow down in capillaries?

(A) Because capillaries are narrow
(B) Because blood pressure is highest
(C) Because the total cross-sectional area is largest
(D) Because capillaries have valves

Correct Answer: C

Explanation: Because the total cross-sectional area is largest — this correctly answers the question.

29. The sinoatrial (SA) node is located in the:

(A) Lower wall of the right atrium
(B) Upper wall of the left atrium
(C) Interventricular septum
(D) Upper wall of the right atrium

Correct Answer: D

Explanation: The sinoatrial (SA) node is located in the Upper wall of the right atrium.

30. What is the function of baroreceptors?

(A) To detect changes in blood pressure
(B) To detect changes in blood volume
(C) To detect changes in oxygen levels
(D) To detect changes in temperature

Correct Answer: A

Explanation: Baroreceptors are mechanoreceptors located in the walls of the aorta and carotid sinus that sense blood pressure and relay information to the brain.

31. What is the function of volume receptors?

(A) To detect changes in blood pressure
(B) To detect changes in blood volume
(C) To detect changes in oxygen levels
(D) To detect changes in temperature

Correct Answer: B

Explanation: Volume receptors (low-pressure baroreceptors) are found in the atria and detect changes in blood volume.

32. What is the role of antidiuretic hormone (ADH) in blood pressure regulation?

(A) It increases heart rate
(B) It causes vasodilation
(C) It causes water retention
(D) It decreases blood volume

Correct Answer: C

Explanation: ADH causes water retention in the kidney, which increases blood volume and blood pressure.

33. What is the function of the coronary circulation?

(A) To supply blood to the lungs
(B) To supply blood to the kidneys
(C) To supply blood to the brain
(D) To supply blood to the heart muscle

Correct Answer: D

Explanation: The myocardium is supplied with blood by the right and left coronary arteries.

34. What is the hepatic portal system?

(A) A system that carries blood from the digestive organs to the liver
(B) A system that carries blood from the heart to the liver
(C) A system that carries blood from the liver to the heart
(D) A system that carries blood from the lungs to the liver

Correct Answer: A

Explanation: The hepatic portal system begins with capillaries in the viscera and ends with the capillaries in the liver.

35. What is the function of the lymphatic system?

(A) To carry oxygen to tissues
(B) To return excess interstitial fluid to the blood
(C) To produce red blood cells
(D) To digest food

Correct Answer: B

Explanation: To return excess interstitial fluid to the blood — this correctly answers the question.

36. A patient has a blockage in the left coronary artery. Which of the following is the most likely consequence?

(A) Decreased blood flow to the lungs
(B) Decreased blood flow to the brain
(C) Decreased blood flow to the heart muscle
(D) Decreased blood flow to the kidneys

Correct Answer: C

Explanation: Decreased blood flow to the heart muscle — this correctly answers the question.

37. A patient has damage to the SA node. Which of the following would be the most likely result?

(A) The heart would stop beating
(B) The heart rate would increase
(C) Blood pressure would increase
(D) The AV node would take over as pacemaker

Correct Answer: D

Explanation: If the SA node fails, the AV node can take over as pacemaker, but at a slower rate.

38. A patient has a prolonged P-R interval on an ECG. This indicates a problem with:

(A) Conduction from atria to ventricles
(B) Atrial depolarization
(C) Ventricular depolarization
(D) Ventricular repolarization

Correct Answer: A

Explanation: The P-R interval represents the time from the start of the P wave to the beginning of the QRS complex, indicating the time required for SA depolarization to reach the ventricles.

39. A patient has a condition that causes widespread vasodilation. Which of the following would be the most likely effect on blood pressure?

(A) Increased blood pressure

(B) Decreased blood pressure
(C) No change in blood pressure
(D) Increased heart rate

Correct Answer: B

Explanation: Vasodilation increases blood vessel diameter, which decreases peripheral resistance and lowers blood pressure.

40. Which of the following would occur if the lymphatic vessels were blocked?

(A) Increased blood volume
(B) Increased heart rate
(C) Accumulation of interstitial fluid (edema)
(D) Increased blood pressure

Correct Answer: C

Explanation: If lymphatic vessels are blocked, excess interstitial fluid cannot be returned to the blood, leading to edema.

41. A patient has a deficiency of vitamin K. Which of the following would be most affected?

(A) Oxygen transport
(B) Glucose absorption
(C) Fat digestion
(D) Blood clotting

Correct Answer: D

Explanation: Vitamin K is essential for blood clotting; deficiency can lead to bleeding problems.

42. Which of the following correctly describes the flow of blood through the heart?

(A) Right atrium → tricuspid valve → right ventricle → pulmonary semilunar valve → pulmonary trunk
(B) Right atrium → bicuspid valve → right ventricle → aortic semilunar valve → aorta
(C) Left atrium → tricuspid valve → left ventricle → pulmonary semilunar valve → pulmonary trunk
(D) Left atrium → bicuspid valve → right ventricle → aortic semilunar valve → aorta

Correct Answer: A

Explanation: Deoxygenated blood from the body enters the right atrium, passes through the tricuspid valve to the right ventricle, then through the pulmonary semilunar valve to the pulmonary trunk.

43. A patient with a failing left ventricle would most likely develop:

(A) Pulmonary edema
(B) Systemic edema
(C) Increased blood pressure
(D) Increased cardiac output

Correct Answer: B

Explanation: A patient with a failing left ventricle would most likely develop Systemic edema.

44. Which of the following is the correct order of the cardiac cycle phases?

(A) Atrial systole → atrial diastole → ventricular systole → ventricular diastole
(B) Ventricular systole → ventricular diastole → atrial systole → atrial diastole
(C) Atrial diastole → atrial systole → ventricular systole → ventricular diastole
(D) Atrial diastole → ventricular systole → atrial systole → ventricular diastole

Correct Answer: C

Explanation: Atrial diastole → atrial systole → ventricular systole → ventricular diastole — this correctly answers the question.

45. Which of the following would increase cardiac output?

(A) Decreased heart rate
(B) Decreased stroke volume
(C) Increased peripheral resistance
(D) Increased heart rate and stroke volume

Correct Answer: D

Explanation: Cardiac output is determined by heart rate and stroke volume; increasing both would increase cardiac output.

46. A patient has a condition that causes excessive production of red blood cells. This would most likely:

(A) Increase blood viscosity
(B) Decrease blood viscosity
(C) Decrease blood pressure
(D) Decrease peripheral resistance

Correct Answer: A

Explanation: Increased red blood cells increase blood viscosity, which can increase blood pressure and resistance to flow.

47. Which of the following is the correct pathway of blood through the pulmonary circulation?

(A) Left ventricle → pulmonary trunk → pulmonary arteries → lungs → pulmonary veins → right atrium
(B) Right ventricle → pulmonary trunk → pulmonary arteries → lungs → pulmonary veins → left atrium
(C) Right atrium → pulmonary trunk → pulmonary arteries → lungs → pulmonary veins → left ventricle
(D) Left atrium → pulmonary trunk → pulmonary arteries → lungs → pulmonary veins → right ventricle

Correct Answer: B

Explanation: The pulmonary circuit carries deoxygenated blood from the right ventricle to the lungs and returns oxygenated blood to the left atrium.

48. A patient with a weak lower esophageal sphincter would most likely experience:

(A) Rapid gastric emptying
(B) Increased bile production
(C) Acid reflux into the esophagus
(D) Decreased pancreatic secretion

Correct Answer: C

Explanation: The lower esophageal sphincter normally prevents stomach acid from entering the esophagus; if weak, acid reflux occurs.

49. Which of the following correctly describes the role of the papillary muscles?

(A) They open the semilunar valves
(B) They close the semilunar valves
(C) They generate action potentials
(D) They prevent AV valves from opening into the atria

Correct Answer: D

Explanation: The papillary muscles contract when the ventricles contract and prevent the valves from opening into the atria by pulling on the chordae tendineae.

50. A patient has a blocked hepatic portal vein. Which of the following would be most affected?

(A) Blood flow from the digestive organs to the liver
(B) Blood flow from the heart to the liver
(C) Blood flow from the liver to the heart
(D) Blood flow from the lungs to the heart

Correct Answer: A

Explanation: The hepatic portal vein carries blood from the digestive organs to the liver; blockage would impair this flow.