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Practice Questions

Try all 30 first, then check the answer key at the back.

1. Which of the following ECG leads are correctly correlated with the area of the heart they represent? Select the two answer options which are correct.

A. Lead I - lateral wall of left ventricle
B. aVR - inferior wall left ventricle
C. Lead v1 - anterior wall of left ventricle
D. Lead II - inferior wall of left ventricle

2. You are evaluating a patient with known heart history who presents with chest pain. Which of the following conditions might mask the signs of a pulmonary embolism on a CT scan and complicate diagnosis?

A. Chronic obstructive pulmonary disease (COPD)
B. Diabetes
C. Hypertension
D. Asthma

3. Which part of the EKG waveform is primarily influenced by left atrial enlargement?

A. QRS complex
B. ST segment
C. T wave
D. P wave

4. A pregnant woman at 38 weeks gestation presents to the emergency department with a certain medication overdose. Which of the following symptoms are classic signs of magnesium sulfate overdose? Select the three answer options which are correct.

A. Respiratory depression
B. Tachycardia
C. Seizures
D. Bradycardia

5. Using the six-second method to estimate heart rate from an EKG strip, identify the correct heart rate based on the number of QRS complexes. QRS Complexes Heart Rate (bpm) 10 100 8 80 6 60 4 40

A. 4 QRS complexes correspond to a heart rate of 60 bpm
B. 10 QRS complexes correspond to a heart rate of 100 bpm
C. 8 QRS complexes correspond to a heart rate of 100 bpm
D. 6 QRS complexes correspond to a heart rate of 80 bpm

6. Which type of traumatic injury does not primarily require large-volume intravenous fluid replacement in the pre-hospital setting?

A. head trauma with increased intracranial pressure (ICP)
B. burn injury
C. spinal injury with neurogenic shock
D. dehydration from severe vomiting

7. If the sinoatrial node and the AV node both fail to initiate an impulse, the Purkinje fibers take over as the heart's pacemaker. How will this appear on the EKG strip?

A. The heart rate is extremely fast
B. There are wide and bizarre QRS complexes
C. There is no T wave
D. There is no P wave

8. Which characteristic of the cardiac cells allows them to respond to electrical impulses?

A. Automaticity
B. Contractility
C. Conductivity
D. Excitability

9. Identify the key characteristic of ventricular fibrillation as observed in an EKG reading.

A. Irregular QRS complexes without discrete P waves
B. A prolonged PR interval with normal QRS complexes
C. Chaotic and disorganized ventricular activity
D. Regular QRS complexes with consistent P waves

10. Which of the following is a beta blocker medication for the treatment of an adult patient with acute myocardial infarction (AMI), particularly for reducing myocardial oxygen demand?

A. Aspirin
B. Nitroglycerin
C. Atropine
D. Metoprolol

11. What is the primary reason for attaching EKG leads to specific body locations?

A. To reduce patient discomfort
B. To ensure the EKG leads are hidden from view
C. To obtain a clear and accurate reading of the heart's electrical activity
D. To make the EKG process quicker

12. During an adult cardiac resuscitation effort, what does an end-tidal $$CO_{2}$$ (ETCO2) of less than 10 mmHg suggest?

A. Chest compressions are inadequate
B. The defibrillation is effective
C. The patient is hypothermic
D. The oxygen saturation is normal

13. A paramedic records a 12-lead EKG with a negative QRS in Lead II and a positive QRS in Lead III. What does this suggest?

A. Normal electrical axis
B. Extreme axis deviation
C. Left axis deviation
D. Right axis deviation

14. You are called to assist a 65-year-old patient with a history of congestive heart failure who is complaining of severe shortness of breath. On arrival, the patient is found to be in acute respiratory distress with frothy sputum production. His $$SpO_{2}$$ is 82 percent on room air. Respirations are 30 per minute and labored. His heart rate is 120 beats per minute with a blood pressure of 150 systolic. Which of the following interventions would be inappropriate at this point?

A. Twelve-lead electrocardiogram analysis
B. Nitroglycerin therapy
C. High-flow oxygen therapy
D. Intravenous access

15. Which of the following hormones is responsible for naturally increasing both the heart rate (positive chronotropic effect) and the strength of the heart's contraction (positive inotropic effect)?

A. Insulin
B. Glucagon
C. Thyroxine
D. Epinephrine

16. During an ambulance ride, how would a paramedic determine the atrial rate on an EKG strip?

A. The number of PR intervals
B. The number of T waves
C. The number of P waves
D. The number of QRS complexes

17. You are called to assist a 28-year-old pregnant patient who is experiencing severe nausea and vomiting in her third trimester. Her vital signs are BP 130/78, HR 115, R 18, $$SpO_{2}$$ 97%. She has been unable to keep any food or fluids down for the past 24 hours. What immediate intervention is required to manage her condition?

A. Administer 4-6 liters per minute of oxygen via nasal cannula to maintain optimal oxygen levels.
B. Provide assisted ventilation with a bag-valve mask to ensure adequate oxygenation.
C. The patient's $$SpO_{2}$$ is 97%, so oxygen therapy is not indicated; focus on preventing dehydration and consider transport for further evaluation.
D. High-flow oxygen at 15 liters per minute via non-rebreather mask to manage potential hypoxia.

18. You are assessing a pregnant woman who is at 28 weeks of gestation. What is the expected normal range for her blood pressure during this stage of pregnancy?

A. 140/90 to 150/100 mmHg
B. 110/70 to 120/80 mmHg
C. 90/60 to 100/70 mmHg
D. 130/80 to 140/90 mmHg

19. During the transport of an intubated adult patient, you notice that the end-tidal $$CO_{2}$$ levels are suddenly rising and breath sounds are becoming diminished. Suctioning attempts reveal thick secretions that are hard to remove. What should be your next course of action to ensure effective ventilation?

A. Administer albuterol through in-line nebulization
B. Increase the rate and depth of mechanical ventilation
C. Switch to a high-frequency ventilator to assist in clearing the secretions
D. Instill 3 to 5 mL of sterile saline directly down the ET tube to loosen thick secretions

20. Which of the following conditions is characterized by an autoimmune attack on the neuromuscular junction, leading to fluctuating muscle weakness and fatigue?

A. Amyotrophic Lateral Sclerosis
B. Muscular Dystrophy
C. Myasthenia Gravis
D. Multiple Sclerosis

21. You are treating an elderly patient who suddenly complains of shortness of breath and is becoming increasingly anxious. Upon examination, you notice a significant swelling under the skin around the neck and upper chest area that crackles when palpated. What is this abnormal finding?

A. Thoracic outlet syndrome
B. Subcutaneous emphysema
C. Cellulitis
D. Lymphadenopathy

22. A patient presents with rapid breathing, a whistling sound heard during exhalation, and visible use of accessory muscles for breathing. Which of the following conditions is most likely occurring?

A. Asthma
B. Pneumothorax
C. Pulmonary Embolism
D. Heart Failure

23. You are preparing to intubate an adult patient who is 45 years old and weighs 70 kg. Which of the following endotracheal tube sizes would be most appropriate for this patient?

A. An 8.0 mm ET tube with a balloon cuff
B. A 7.0 mm ET tube without a balloon cuff
C. A 6.0 mm ET tube without a balloon cuff
D. A 5.0 mm ET tube with a balloon cuff

24. Identify the respiratory pattern that is characterized by progressively deeper and faster breathing, followed by a gradual decrease leading to a temporary stop in breathing (apnea), often observed in patients with heart failure or brain injury.

A. Biot's respiratory pattern
B. Cheyne-Stokes respiratory pattern
C. Kussmaul's respiratory pattern
D. Ataxic respiratory pattern

25. A 60-year-old patient presents with sudden-onset shortness of breath and chest pain after a long international flight. He has a history of chronic venous insufficiency. Based on these symptoms and history, which of the following conditions should you suspect until proven otherwise?

A. Pulmonary embolus
B. Air embolus
C. Pneumothorax
D. Myocardial infarction

26. Which of the following injuries fall under the classification of a Zone III neck injury? Select the 3 answer options which are correct.

A. Aortic arch
B. Trachea
C. Esophagus
D. Internal jugular veins

27. Which of the following would most likely be present in a trauma patient with blood loss in a Class III hemorrhage? Select the three answer options which are correct.

A. Rapid breathing
B. Confusion or anxiousness
C. A rapid, bounding pulse
D. Warm, dry skin

28. Your patient has sustained a pelvic fracture from a high-impact car accident. The injury site shows signs of significant bruising and swelling, but there is no external bleeding. How much blood could be lost internally, if a closed pelvic fracture is present?

A. 250-500 mL
B. 500-1,000 mL
C. Over 2,500 mL
D. 1,500-2,000 mL

29. You arrive first at the scene of a multi-vehicle collision on a highway. There are several vehicles involved, and you see multiple people with apparent injuries. What should your first course of action be?

A. Establish command and request additional resources, such as fire rescue and additional ambulances.
B. Begin immediate triage and treatment of the most critically injured patients.
C. Call medical control to inform them of the situation.
D. Notify the nearest trauma center so they can prepare for incoming patients.

30. While decontaminating your ambulance after transporting a patient with a suspected infectious disease, which of the following contaminated items should not be placed in a plastic biohazard bag?

A. Blood-soaked bandages
B. Used scalpel blade
C. Contaminated gloves
D. Used surgical mask

Answer Key & Explanations

1. A — Lead I - lateral wall of left ventricle
Leads II, III and aVF represent the inferior wall of the left ventricle. Leads V1 and V2 represent the septum. Leads V3 and V4 represent the anterior wall of the left ventricle. Leads I, aVL, V5, and V6 represent the lateral wall of the left ventricle. Lead aVR obtains information from the upper right side of the heart, and is only used for reciprocal changes in 12-lead ECG.

2. A — Chronic obstructive pulmonary disease (COPD)
Answer: Chronic obstructive pulmonary disease (COPD) COPD can cause changes in the pulmonary vasculature and airways, potentially obscuring signs of a pulmonary embolism on imaging studies. It is crucial to consider COPD in patients with a history of smoking or other risk factors. Diabetes, hypertension, and asthma are less likely to interfere with CT findings for pulmonary embolism. While they may present with other complications, they do not typically mask the radiographic appearance of a PE.

3. D — P wave
Answer: P wave Left atrial enlargement can be identified by specific changes in the P wave. It typically leads to a broad, notched P wave in the EKG tracing.

4. A — Respiratory depression
Magnesium sulfate is often used in obstetric management for conditions like preeclampsia. Overdose of magnesium sulfate can lead to bradycardia, hyporeflexia, and respiratory depression. Tachycardia and seizures are not typical symptoms of magnesium sulfate toxicity.

5. B — 10 QRS complexes correspond to a heart rate of 100 bpm
Answer: 10 QRS complexes correspond to a heart rate of 100 bpm. To use the six-second strip method, count the number of QRS complexes within a 6-second interval and multiply that number by 10 to calculate the heart rate in beats per minute (bpm). For example, if there are 10 QRS complexes in six seconds: $$10 \times 10 = 100$$ bpm.

6. A — head trauma with increased intracranial pressure (ICP)
Answer: head trauma with increased intracranial pressure (ICP) Head trauma resulting in increased intracranial pressure does not typically require aggressive fluid resuscitation. In fact, excessive fluid administration could worsen cerebral edema, leading to more rapid deterioration. Burn injuries, spinal injuries with neurogenic shock, and severe dehydration all require the administration of large amounts of IV fluids to stabilize the patient and correct hypovolemia.

7. B — There are wide and bizarre QRS complexes
Answer: There are wide and bizarre QRS complexes The Purkinje fibers initiating the impulse results in a ventricular rhythm. This leads to wide and bizarre QRS complexes on the EKG, as the impulse is not following the usual pathway through the AV node and Bundle of His.

8. D — Excitability
Answer: Excitability Excitability is the cell's ability to respond to electrical impulses by depolarization.

Automaticity is the cell's ability to create impulses without any outside stimulation. Contractility is the ability to contract the cardiac muscle. Conductivity is the ability to pass electrical impulses along neighboring cells.

9. C — Chaotic and disorganized ventricular activity
Ventricular fibrillation is typified by disorganized electrical activity in the ventricles leading to chaotic and erratic EKG patterns. The heart's pumping action becomes ineffective, which is a life-threatening medical emergency.

10. D — Metoprolol
Answer: Metoprolol Metoprolol is a beta-blocker (class II) often used in the treatment of acute myocardial infarction (AMI) for reducing myocardial oxygen demand by decreasing heart rate and contractility. This helps in reducing the overall workload on the heart. Aspirin is an antiplatelet agent and is used to prevent further clot formation but is not a beta-blocker. Nitroglycerin is a nitrate used for vasodilation to relieve chest pain, not a beta-blocker. Atropine is an anticholinergic used to treat bradycardia, not a beta-blocker.

11. C — To obtain a clear and accurate reading of the heart’s electrical activity
Answer: To obtain a clear and accurate reading of the heart’s electrical activity EKG leads are attached to specific body locations to ensure an accurate and clear reading of the heart's electrical activity. Placement at these standardized locations helps in achieving consistent results, which are crucial for proper diagnosis and treatment.

12. A — Chest compressions are inadequate
Answer: Chest compressions are inadequate During a cardiac resuscitation effort, an ETCO2 reading of less than 10 mmHg suggests that the quality of chest compressions is not sufficient. In effective cardiopulmonary resuscitation (CPR), the target ETCO2 is between 35-40 mmHg. Low ETCO2 readings during resuscitation indicate poor circulation and inadequate perfusion, meaning that oxygen is not being delivered efficiently to the tissues. This does not relate to the effectiveness of defibrillation, the patient's body temperature, or oxygen saturation levels.

13. C — Left axis deviation
Answer: Left axis deviation. Assess leads II and III on the 12-lead EKG to determine axis deviation. A negative QRS in Lead II and a positive QRS in Lead III indicate left axis deviation. If there is a positive QRS in both leads, this indicates normal axis deviation. Negative QRS in both leads suggests extreme axis deviation.

14. B — Nitroglycerin therapy
Answer: Nitroglycerin therapy Nitroglycerin therapy should not be administered to a patient who is exhibiting symptoms of acute pulmonary edema with a high heart rate and blood pressure, as it may not provide immediate relief and could potentially worsen the patient's condition. This patient's condition suggests a different primary intervention such as CPAP or diuretics. High-flow oxygen therapy would be indicated to improve oxygenation. Intravenous access is crucial for administering medications or fluids. A twelve-lead electrocardiogram analysis helps in identifying any underlying cardiac issues.

15. D — Epinephrine
Answer: Epinephrine Epinephrine, also known as adrenaline, is released by the adrenal medulla and stimulates an increase in the heart rate (positive chronotropic effect) and the force of muscle contraction (positive inotropic effect). Insulin is a hormone that regulates blood glucose levels, and it has no direct effect on heart rate or contraction strength. Glucagon also regulates glucose levels but does not affect the heart in the same way as epinephrine. Thyroxine, produced by the thyroid gland, primarily affects metabolism and has

a slower, more general effect on cardiovascular function.

16. C — The number of P waves
Answer: The number of P waves To determine the atrial rate, the number of P waves is counted on the EKG strip. This is because each P wave represents one atrial contraction or depolarization.

17. C — The patient's $$SpO_{2}$$ is 97%, so oxygen therapy is not indicated; focus on preventing dehydration and consider transport for further evaluation.
The patient's $$SpO_{2}$$ is 97%, which indicates she is well-oxygenated and does not require supplemental oxygen at this time. The primary concern should be managing her nausea and preventing dehydration due to her inability to keep food or fluids down for the past 24 hours. Immediate intervention should include assessing her fluid status and considering transport to a medical facility for further management, including potential IV hydration and antiemetics.

18. B — 110/70 to 120/80 mmHg
Answer: 110/70 to 120/80 mmHg During pregnancy, it is important to monitor the expectant mother's blood pressure to ensure both her health and the baby's health. The expected normal range for blood pressure during the second trimester of pregnancy is typically between 110/70 mmHg and 120/80 mmHg. Lower ranges, such as 90/60 to 100/70 mmHg, might be considered hypotensive, while higher ranges, such as 130/80 to 140/90 mmHg, could indicate hypertensive disorders like preeclampsia.

19. D — Instill 3 to 5 mL of sterile saline directly down the ET tube to loosen thick secretions
Answer: Instill 3 to 5 mL of sterile saline directly down the ET tube to loosen thick secretions To effectively manage thick secretions that impede ventilation, instilling 3 to 5 mL of sterile saline can help loosen the secretions, making them easier to suction out. Before performing tracheobronchial suctioning through the ET tube, oxygenate the patient with 100% $$O_{2}$$ for at least five minutes. Repeat the oxygenation process with 100% $$O_{2}$$ between suction attempts. Administering albuterol is not effective for loosening thick secretions and managing airway patency in this context. Increasing the rate and depth of ventilation may lead to lung tissue damage, including pneumothorax. Switching to a high-frequency ventilator is not appropriate in pre-hospital settings and could cause further complications due to increased intrapleural pressure.

20. C — Myasthenia Gravis
Answer: Myasthenia Gravis Myasthenia Gravis is an autoimmune disorder that targets the acetylcholine receptors at the neuromuscular junction, leading to fluctuating muscle weakness and fatigue. This condition can cause severe weakness, including respiratory muscle involvement, which might require medical intervention. Multiple Sclerosis is a disease where immune-mediated processes attack the myelin sheath of nerve fibers in the brain and spinal cord, leading to progressive neurological deterioration but does not specifically target the neuromuscular junction. Amyotrophic Lateral Sclerosis (ALS) is a progressive neurodegenerative disease that affects nerve cells in the brain and spinal cord, causing loss of muscle control but is not primarily an autoimmune disease. Muscular Dystrophy is a group of genetic diseases characterized by progressive weakness and loss of muscle mass, but it is not related to autoimmune attacks on the neuromuscular junction.

21. B — Subcutaneous emphysema
Answer: Subcutaneous emphysema. Subcutaneous emphysema happens when air escapes from the lungs or airways into the subcutaneous tissues, often due to a trauma or underlying lung pathology. When palpated, it feels like pockets of air under the skin that produce a crackling sensation. Cellulitis is a bacterial skin infection

that causes redness, swelling, and warmth, but does not produce a crackling sensation. Lymphadenopathy refers to swollen or enlarged lymph nodes, and thoracic outlet syndrome involves compression of nerves or blood vessels near the neck, neither of which mimic subcutaneous emphysema.

22. A — Asthma
Answer: Asthma Asthma is characterized by episodes of widespread but variable airflow obstruction, which is often reversible either spontaneously or with treatment. The classic signs and symptoms include rapid breathing (tachypnea), wheezing (a whistling sound during exhalation), and visible use of accessory muscles for breathing. These indicators strongly point towards an asthma attack. Pneumothorax, pulmonary embolism, and heart failure may present with some breathing difficulties but they do not typically include wheezing or the visible use of accessory muscles.

23. A — An 8.0 mm ET tube with a balloon cuff
Answer: An 8.0 mm ET tube with a balloon cuff. When choosing an appropriately sized ET tube for an adult, the general rule is to use a tube of approximately the same size for males and females based on approximate weight ranges. In this case, an 8.0 mm tube would be most appropriate. It is important to use an ET tube with a balloon cuff to seal the airway adequately. ET tubes that are too small or without a cuff may not provide effective ventilation and can lead to complications.

24. B — Cheyne-Stokes respiratory pattern
Answer: Cheyne-Stokes respiratory pattern Cheyne-Stokes respiration is characterized by a cycle of progressively deeper and faster breathing, followed by a gradual decrease resulting in a period of apnea. This pattern is often observed in patients with heart failure or brain injuries. Kussmaul's respirations are regular, rapid, and deep, typically associated with metabolic acidosis conditions such as Diabetic Ketoacidosis (DKA). Ataxic respiratory pattern involves completely irregular breathing with random periods of apnea, commonly seen in brainstem injury. Biot's respirations are irregular with varying depth and periods of apnea, lacking repetitiveness and often irregular.

25. A — Pulmonary embolus
Answer: Pulmonary embolus A pulmonary embolus (PE) occurs when a blood clot, usually from the deep veins of the legs, travels to the lungs and obstructs a pulmonary artery. This condition is particularly common in individuals with a history of venous disease or in those who have been immobilized for long periods, such as during a long flight. Symptoms of a PE can include sudden-onset shortness of breath, chest pain, and in some cases, diaphoresis (sweating). An air embolus typically results from medical procedures that introduce air into the venous system, such as improper IV insertion. A pneumothorax involves air in the pleural space causing lung collapse, which would present with different clinical signs like unilateral chest movement and absent breath sounds on the affected side. A myocardial infarction, or heart attack, usually presents with chest pain but does not typically cause sudden-onset shortness of breath and chest pain together in the same context as a PE.

26. D — Internal jugular veins
Zone III of the neck is the area between the angle of the mandible and the base of the skull. The following structures are located here: Internal jugular veins Vertebral arteries Spinal cord The aortic arch is found in Zone I of the neck. The Trachea and Esophagus are found in Zone II of the neck.

27. A — Rapid breathing
A trauma patient with blood loss in a Class III hemorrhage will present as seriously ill with: • A rapid, thready

pulse (> 120) • Hypotension • Delayed cap refill • Tachypnea (> 28) • Cold, pale, moist skin • Confusion/anxiousness The pulse will not be bounding in this stage of hemorrhage due to hypotension and blood loss.

28. D — 1,500-2,000 mL
Answer: 1,500-2,000 mL. It is possible for a patient suffering from a closed pelvic fracture to lose as much as 1,500-2,000 mL of blood in the compartments around the bone. This amount of blood loss is significant enough to cause hypovolemic shock in patients. A closed tib/fib fracture usually results in a blood loss of approximately 250-500 mL, while a closed femur fracture could cause a blood loss of around 1,000-1,500 mL. A hemorrhage of over 2,500 mL would likely cause severe hypovolemic shock and could only occur in extreme cases of abdominal or chest injuries with major hemorrhage.

29. A — Establish command and request additional resources, such as fire rescue and additional ambulances.
Correct answer: Establish command and request additional resources, such as fire rescue and additional ambulances. When arriving at the scene of a major incident, it is essential to quickly assess the situation (scene size-up) to determine what additional resources will be needed. Establishing command helps ensure a coordinated response. It's critical to request necessary resources to manage the scene effectively. Starting immediate patient care without assessing the scene and requesting additional resources could compromise safety and lead to mismanagement of the incident. There is also no guarantee that the necessary resources will be dispatched without explicit communication. Contacting medical control or notifying the trauma center are important steps but should occur after ensuring adequate resources are en route.

30. B — Used scalpel blade
Answer: Used scalpel blade Used scalpel blades are sharp and pose a puncture hazard. They should be placed in a puncture-proof sharps container, not a plastic biohazard bag. Items like contaminated gloves, used surgical masks, and blood-soaked bandages can be safely placed in plastic biohazard bags as they generally do not pose a puncture risk.

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