

Advanced Exercise Science Proficiency

Exercise Science · Practice Test · 12 Questions

1. Which specific protein filament is primarily responsible for the 'power stroke' during the sliding filament theory of muscle contraction?

- A) Tropomyosin
- B) Troponin
- C) Myosin
- D) Actin

2. In the context of cardiac output, which hormone is the primary catecholamine released by the adrenal medulla to increase heart rate during acute exercise?

- A) Epinephrine
- B) Cortisol
- C) Aldosterone
- D) Glucagon

3. The 'Bohr Effect' describes the shift of the oxygen-hemoglobin dissociation curve to the right, which is primarily caused by which factor during intense exercise?

- A) Increased pH
- B) Decreased PCO₂
- C) Decreased body temperature
- D) Increased hydrogen ion concentration

4. Which muscle fiber type is characterized by high mitochondrial density, high capillary density, and a high concentration of myoglobin?

- A) Type Ix
- B) Type I
- C) Type IIa
- D) Type IIb

5. What is the primary function of the Golgi tendon organ (GTO) in the human musculoskeletal system?

- A) Detecting muscle length
- B) Detecting muscle tension
- C) Initiating the stretch reflex
- D) Inhibiting antagonist muscles

6. During steady-state aerobic exercise, which metabolic pathway provides the majority of ATP for muscle contraction?

- A) Phosphagen system
- B) Anaerobic glycolysis
- C) Beta-oxidation
- D) Oxidative phosphorylation

7. Which anatomical plane divides the body into superior and inferior segments?

- A) Sagittal
- B) Frontal
- C) Transverse
- D) Coronal

8. What is the rate-limiting enzyme in the process of glycolysis?

- A) Hexokinase
- B) Phosphofructokinase
- C) Pyruvate kinase
- D) Lactate dehydrogenase

9. Which sensory receptor is specifically sensitive to rapid changes in muscle length and contributes to the monosynaptic stretch reflex?

- A) Pacinian corpuscle
- B) Muscle spindle
- C) Meissner corpuscle
- D) Free nerve ending

10. In the Frank-Starling mechanism, an increase in end-diastolic volume leads to an increase in stroke volume primarily due to what change?

- A) Increased myocardial contractility
- B) Increased venous return and sarcomere stretch
- C) Decreased afterload
- D) Reduced peripheral resistance

11. Which mineral is essential for the binding of troponin to tropomyosin to allow for actin-myosin cross-bridge formation?

- A) Magnesium
- B) Sodium
- C) Calcium
- D) Potassium

12. What is the term for the maximal amount of oxygen that can be consumed per minute during exhaustive physical activity?

- A) Ventilatory threshold
- B) VO₂ max
- C) Oxygen deficit
- D) EPOC