

Advanced Exercise Physiology and Human Anatomy

Exercise Science · Answer Key · 12 Questions

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

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

2. In the context of the Frank-Starling Law, what is the primary determinant of increased stroke volume?

- A) Increased end-diastolic volume**
- B) Decreased systemic vascular resistance
- C) Increased parasympathetic stimulation
- D) Decreased myocardial contractility

3. During sustained submaximal aerobic exercise, which metabolic byproduct is increasingly utilized by the heart muscle for energy?

- A) Glucose
- B) Lactate**
- C) Glycerol
- D) Palmitate

4. Which muscle fiber type is characterized by high mitochondrial density, slow contraction speed, and high resistance to fatigue?

- A) Type IIx
- B) Type IIa
- C) Type I**
- D) Type IIb

5. What is the primary physiological mechanism by which the Bohr effect enhances oxygen delivery to tissues?

- A) Increased pH in the blood
- B) Decreased partial pressure of CO₂
- C) Rightward shift of the oxyhemoglobin dissociation curve**
- D) Inhibition of 2,3-DPG production

6. Which structural unit of a muscle fiber is defined as the region between two consecutive Z-discs?

- A) Sarcomere**
- B) Myofibril
- C) Sarcoplasmic reticulum
- D) T-tubule

7. What is the net gain of ATP molecules produced through substrate-level phosphorylation in the glycolytic pathway?

- A) 1
- B) 2**
- C) 4
- D) 36

8. Which hormonal response is specifically triggered by high-intensity resistance training to stimulate protein synthesis?

- A) Increased secretion of cortisol
- B) Decreased secretion of testosterone
- C) Increased pulsatile release of growth hormone**
- D) Inhibition of insulin-like growth factor 1

9. What is the primary anatomical site for the integration of sensory input to adjust motor output during complex movement?

- A) Cerebellum**
- B) Medulla oblongata
- C) Pons
- D) Hypothalamus

10. Which enzyme is the rate-limiting factor in the glycolysis pathway?

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

11. In an eccentric muscle contraction, what occurs at the molecular level regarding cross-bridge formation?

- A) Actin and myosin filaments slide toward the M-line
- B) Cross-bridges form and break while the muscle lengthens**
- C) Myosin heads remain permanently bound to actin
- D) The Z-discs move closer together

12. Which structure within the muscle cell is responsible for the storage and controlled release of calcium ions?

A) Sarcolemma

B) Sarcoplasmic reticulum

C) Mitochondria

D) Lysosomes