

Advanced Exercise Science Concepts

Exercise Science · Answer Key · 18 Questions

1. What is the primary site of oxygen consumption and ATP production during aerobic metabolism in skeletal muscle cells?

- A) Sarcoplasmic Reticulum
- B) Sarcomere
- C) Mitochondria**
- D) Golgi Apparatus

2. Which of the following is the primary muscle action characterized by a decrease in muscle length under a constant load?

- A) Isometric
- B) Eccentric
- C) Isokinetic
- D) Concentric**

3. The lactate threshold is typically defined as the highest intensity of exercise at which:

- A) Blood lactate begins to accumulate exponentially**
- B) Oxygen consumption reaches its maximum
- C) Heart rate exceeds 90% of maximum
- D) Glycogen stores are fully depleted

4. What is the average resting heart rate for a healthy adult?

- A) 150-180 bpm
- B) 120-140 bpm
- C) 60-100 bpm**
- D) 40-50 bpm

5. Which hormone is primarily responsible for promoting glucose uptake into cells during and after exercise?

- A) Glucagon
- B) Cortisol
- C) Epinephrine
- D) Insulin**

6. In biomechanics, what term describes the resistance to acceleration of a body or object?

- A) Velocity
- B) Momentum
- C) Inertia**
- D) Force

7. Which type of muscle fiber is characterized by its high oxidative capacity, slow contraction speed, and resistance to fatigue?

- A) Type IIb
- B) Type IIa
- C) Type I**
- D) All muscle fibers equally

8. The Valsalva maneuver, often used in strength training, involves:

- A) Exhaling forcefully during exertion
- B) Holding one's breath during exertion**
- C) Inhaling deeply after exertion
- D) Relaxing abdominal muscles during exertion

9. What is the typical range for VO₂ max in elite male endurance athletes?

- A) 30-40 ml/kg/min
- B) 40-50 ml/kg/min
- C) 70-85 ml/kg/min**
- D) 90-100 ml/kg/min

10. Which neurotransmitter is primarily involved in muscle contraction at the neuromuscular junction?

- A) Dopamine
- B) Serotonin
- C) Acetylcholine**
- D) Norepinephrine

11. During steady-state aerobic exercise, the primary source of fuel for muscles shifts from predominantly carbohydrates to a greater reliance on which macronutrient as exercise duration increases?

- A) Protein
- B) Fats**
- C) Micronutrients
- D) Water

12. What is the principle of reversibility in training, often referred to as the 'use it or lose it' principle?

A) Adaptations to training are temporary and will be lost if training stops

B) Training adaptations are permanent

C) Training intensity must always increase

D) Specific adaptations occur only with specific training

13. Which phase of the stretch-shortening cycle is characterized by the eccentric loading of a muscle?

A) Amortization

B) Concentric

C) Eccentric

D) Isometric

14. What is the physiological term for the body's ability to maintain a stable internal environment despite external changes?

A) Allostasis

B) Adaptation

C) Homeostasis

D) Metabolism

15. Which joint movement involves decreasing the angle between two bones at a joint?

A) Abduction

B) Extension

C) Flexion

D) Rotation

16. The Cori Cycle describes the metabolic pathway where lactate is converted to glucose in which organ?

A) Skeletal Muscle

B) Adrenal Gland

C) Kidney

D) Liver

17. What is the maximum heart rate formula most commonly used in exercise physiology for estimating an individual's theoretical maximum heart rate?

A) $220 - \text{Age}$

B) $208 - (0.7 \times \text{Age})$

C) $215 - \text{Age}$

D) $190 - (0.5 \times \text{Age})$

18. Which component of skill-related fitness refers to the ability to change the body's position effectively and efficiently?

A) Agility

B) Coordination

C) Balance

D) Power