

Advanced Sports Science for Young Athletes

Sports Science · Answer Key · 10 Questions

1. What is the primary function of the Golgi Tendon Organ (GTO) in proprioception during resistance training?

- A) To initiate a stretch reflex, causing muscle contraction.
- B) To monitor muscle tension and inhibit muscle contraction when tension becomes excessive.**
- C) To detect changes in muscle length and signal the brain to adjust posture.
- D) To enhance the rate of muscle fiber recruitment for maximal force production.

2. Which of the following metabolic pathways is the most significant contributor to ATP production during high-intensity, short-duration exercise (e.g., a 100m sprint)?

- A) Aerobic Respiration (Krebs Cycle and Oxidative Phosphorylation)
- B) Glycolysis (Anaerobic)
- C) Beta-Oxidation of Fatty Acids
- D) The Phosphagen System (ATP-PCr)**

3. In biomechanics, what does the term 'center of mass' refer to in relation to a moving athlete?

- A) The point where the athlete's body is perfectly balanced on a single leg.
- B) The geometric center of the athlete's entire body mass, regardless of limb position.**
- C) The highest point an object reaches during projectile motion.
- D) The intersection of all forces acting upon the athlete's body.

4. What is the primary physiological adaptation observed in response to regular, prolonged aerobic endurance training regarding the cardiovascular system?

- A) Increased resting heart rate and decreased stroke volume.
- B) Decreased maximal cardiac output and increased blood viscosity.
- C) Increased left ventricular hypertrophy and enhanced stroke volume.**
- D) Reduced capillary density in skeletal muscles and decreased mitochondrial volume.

5. Which macronutrient plays a critical role in muscle protein synthesis and repair, especially following strenuous exercise?

- A) Complex Carbohydrates
- B) Monounsaturated Fats
- C) Protein**
- D) Dietary Fiber

6. What does the concept of 'specificity' in training principles imply for an athlete preparing for a basketball game?

- A) Training should focus on improving general cardiovascular fitness through long-distance running.
- B) Training drills should mimic the energy systems and movement patterns used in basketball.**
- C) The athlete should engage in a variety of unrelated sports to develop broad athleticism.
- D) Recovery methods should be prioritized over training intensity.

7. Which of the following is a key indicator of overtraining syndrome that can be measured through physiological monitoring?

- A) A sustained increase in resting heart rate.**
- B) A decrease in perceived exertion during submaximal exercise.
- C) An elevated morning heart rate variability (HRV) compared to baseline.
- D) Increased levels of cortisol indicating improved recovery.

8. What is the primary role of creatine monohydrate supplementation in sports performance?

- A) To enhance aerobic capacity and endurance.
- B) To increase muscle protein synthesis and hypertrophy.
- C) To improve the regeneration of ATP in short, high-intensity bursts.**
- D) To reduce inflammation and muscle soreness.

9. During plyometric exercises, the rapid eccentric contraction followed immediately by a concentric contraction is known as the:

- A) Stretch-shortening cycle**
- B) Isokinetic contraction
- C) Isometric hold
- D) Eccentric overload phase

10. What is the recommended daily protein intake range for adolescent athletes engaged in regular training to support muscle growth and repair?

- A) 0.5 - 1.0 grams per kilogram of body weight
- B) 1.2 - 1.7 grams per kilogram of body weight**
- C) 2.5 - 3.0 grams per kilogram of body weight
- D) Less than 0.5 grams per kilogram of body weight