Advanced Sports Science Fundamentals

Sports Science · Answer Key · 15 Questions

1. Which specific energy system provides the majority of ATP for high-intensity exercise lasting between 30 and 90 seconds?

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

2. What is the term for the physiological state where the rate of lactate production exceeds the rate of lactate clearance in the blood?

A) Lactate threshold
B) VO2 max
C) EPOC
D) Steady state

3. During a muscle contraction, which protein filament primarily slides past myosin to shorten the sarcomere?

A) Tropomyosin
B) Actin
C) Troponin
D) Titin

4. In biomechanics, what does the 'moment of inertia' represent in relation to a rotating body?

A) Resistance to linear acceleration
B) Rate of change of angular velocity
C) Resistance to angular acceleration
D) Total angular momentum

5. Which heart valve prevents the backflow of blood from the aorta into the left ventricle?

A) Mitral valve
B) Tricuspid valve
C) Pulmonary valve
D) Aortic valve

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6. What is the primary function of satellite cells in skeletal muscle tissue following intense training?

A) Increasing metabolic rate
B) Facilitating muscle hypertrophy and repair
C) Reducing systemic inflammation
D) Regulating blood glucose uptake

7. Which hormone is primarily responsible for the stimulation of erythropoiesis, increasing red blood cell production for oxygen transport?

A) Cortisol
B) Erythropoietin
C) Glucagon
D) Aldosterone

8. What is the effect of 'eccentric' muscle action on force production capabilities compared to concentric action?

A) Lower force production
B) Equal force production
C) Higher force production
D) Negligible force production

9. Which proprioceptor is located within the muscle tendon and responds to changes in muscle tension?

A) Muscle spindle
B) Golgi tendon organ
C) Pacinian corpuscle
D) Meissner's corpuscle

10. What is the 'Frank-Starling law' of the heart primarily related to?

A) Stroke volume and end-diastolic volume
B) Heart rate and blood pressure
C) Cardiac output and peripheral resistance
D) Oxygen extraction at the tissue level

11. Which type of muscle fiber is characterized by high mitochondrial density and high resistance to fatigue?

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

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12. What is the primary byproduct of the aerobic metabolism of glucose that is exhaled by the lungs?

A) Lactic acid
B) Carbon monoxide
C) Carbon dioxide
D) Urea

13. In terms of lever systems in the human body, what class of lever is most commonly represented by the bicep curl (elbow flexion)?

A) First-class
B) Second-class
C) Third-class
D) Fourth-class

14. What does the 'oxygen deficit' represent during the transition from rest to steady-state exercise?

A) The amount of oxygen consumed during recovery
B) The difference between oxygen demand and oxygen uptake
C) The total oxygen storage capacity of the blood
D) The rate of mitochondrial respiration

15. Which specific electrolyte imbalance is most commonly associated with severe muscle cramping during prolonged physical exertion?

A) Hyponatremia
B) Hypercalcemia
C) Hypokalemia
D) Hyperphosphatemia

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