

Advanced Human Physiology and Health in Physical Education

Physical Education Theory · Answer Key · 12 Questions

1. Which of the following muscle fiber types is characterized by its high oxidative capacity, slow contraction speed, and resistance to fatigue, making it ideal for endurance activities?

- A) Type IIx (Fast-glycolytic)
- B) Type IIa (Fast-oxidative-glycolytic)
- C) Type I (Slow-oxidative)**
- D) Type IIb (Fast-glycolytic)

2. What is the primary mechanism by which anaerobic glycolysis produces ATP during high-intensity exercise?

- A) Oxidative phosphorylation in mitochondria
- B) The Krebs cycle and electron transport chain
- C) Breakdown of phosphocreatine
- D) Conversion of pyruvate to lactate**

3. The Valsalva maneuver, characterized by forced exhalation against a closed glottis, can lead to a significant increase in intrathoracic pressure. This effect primarily impacts the cardiovascular system by:

- A) Increasing venous return and stroke volume
- B) Decreasing peripheral resistance and blood pressure
- C) Reducing cardiac output and blood pressure transiently**
- D) Enhancing oxygen saturation of hemoglobin

4. What is the physiological role of myoglobin in skeletal muscle during exercise?

- A) To catalyze the breakdown of glycogen
- B) To store and transport oxygen within muscle cells**
- C) To facilitate the binding of actin and myosin filaments
- D) To buffer lactic acid accumulation

5. Which component of the nervous system is responsible for the 'fight or flight' response, leading to physiological changes like increased heart rate and bronchodilation during acute stress or exercise?

- A) Parasympathetic nervous system
- B) Somatic nervous system
- C) Autonomic nervous system (Sympathetic division)**
- D) Central nervous system (Cerebellum)

6. The principle of Specificity in training dictates that adaptations are specific to the type of training performed. For example, training the cardiovascular system will have minimal impact on:

- A) VO2 max
- B) Mitochondrial density in muscles
- C) Muscular strength and power**
- D) Resting heart rate

7. What is the primary function of osteoblasts in bone tissue?

- A) Resorption of old bone tissue
- B) Formation of new bone tissue**
- C) Sensing mechanical stress on bone
- D) Lubrication of joints

8. During prolonged endurance exercise, the body relies increasingly on which fuel source as glycogen stores deplete?

- A) Dietary carbohydrates
- B) Creatine phosphate
- C) Fatty acids (lipids)**
- D) Branched-chain amino acids

9. What is the physiological significance of the Golgi tendon organ?

- A) To detect muscle length changes
- B) To monitor muscle tension and initiate a stretch reflex**
- C) To detect changes in joint position
- D) To transmit motor commands to muscles

10. Which of the following hormones plays a crucial role in regulating blood glucose levels by promoting the uptake of glucose from the bloodstream into cells?

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

11. What is the main function of articular cartilage in synovial joints?

- A) To produce synovial fluid
- B) To anchor muscles to bones
- C) To provide a smooth, low-friction surface for joint movement**
- D) To increase the range of motion

12. The concept of 'overtraining syndrome' is characterized by a persistent decline in performance, increased fatigue, and mood disturbances. Physiologically, this can be linked to:

- A) Increased anabolic hormone levels
- B) Reduced levels of inflammatory markers
- C) Disruptions in the hypothalamic-pituitary-adrenal (HPA) axis**
- D) Enhanced immune system function