Name: _____ **Date:** _____

Answer Key: When Your Metabolism Goes Rogue: 11th Grade Fitness Bioenergetics Quiz

Calculate metabolic thresholds and evaluate periodization models to optimize individual physiological adaptations and peak performance outcomes.

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1. A cyclist performing a 40km time trial begins to experience a sharp rise in blood lactate that exceeds their clearance rate. Which physiological milestone have they most likely surpassed?

Answer: B) Onset of Blood Lactate Accumulation (OBLA)

OBLA is the specific point during intensifying exercise where lactate levels rise exponentially, typically at 4 mmol/L, indicating a shift in metabolic demand.

2. An athlete utilizing 'Non-Linear Periodization' maintains the exact same volume and intensity for 4-6 weeks to ensure cellular adaptation before changing stimulus.

Answer: B) False

False. Non-linear (undulating) periodization involves frequent changes in intensity and volume within a single week (microcycle) to prevent plateaus.

3. In advanced resistance training, the principle of ____ suggests that as an individual nears their genetic ceiling, the rate of adaptation slows significantly despite increased effort.

Answer: C) Diminishing Returns

The Law of Diminishing Returns dictates that well-trained athletes require more complex stimuli to yield smaller incremental gains compared to beginners.

4. If a rock climber is performing a 15-second explosive 'dyno' move, which energy system is primarily responsible for the immediate resynthesis of ATP?

Answer: C) Phosphagen System (ATP-PC)

The Phosphagen system provides immediate energy for high-intensity, short-duration activities lasting approximately 0-15 seconds.

5. The 'Henneman Size Principle' explains that motor units are recruited in order from ____ throughout a muscle contraction.

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Answer: B) Smallest to Largest

Henneman's Size Principle states that smaller, low-threshold motor units (Type I) are recruited before larger, high-threshold units (Type II) as force demands increase.

6. Plyometric training utilizes the Stretch-Shortening Cycle (SSC) to increase power output by leveraging the elastic energy stored during the eccentric phase.

Answer: A) True

True. The SSC involves a rapid eccentric elongation followed by a concentric contraction, using the muscle spindle reflex and elastic recoil for increased force.

7. When designing a macrocycle for a triathlete, which phase involves the highest volume of aerobic work with the lowest sport-specific intensity?

Answer: D) General Preparatory Phase

The General Preparatory phase (base building) focuses on establishing a physiological foundation through high volume and moderate intensity.

8. In the context of flexibility, _____ inhibition occurs when a muscle is stretched and the Golgi Tendon Organ (GTO) causes the muscle to relax to prevent injury.

Answer: B) Autogenic

Autogenic inhibition is a protective mechanism where tension in the tendon triggers a reflex that relaxes that same muscle.

9. Hypertrophy is defined as the increase in the total number of muscle fibers (muscular hyperplasia) rather than the increase in the size of existing fibers.

Answer: B) False

False. Hypertrophy refers to the increase in cross-sectional area of existing fibers; Hyperplasia (cell division) is not widely proven to occur in humans.

10. A marathoner hits 'the wall' at mile 20. Biochemically, this is most likely due to the depletion of which primary fuel source?

Answer: A) Liver and Muscle Glycogen

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The phenomenon of 'hitting the wall' corresponds to the limit of glycogen storage; once depleted, the body must rely on fat oxidation, which is a slower energy process.