Study Guide

Measurement of Work, Power, and Energy Expenditure

Module 1- Measurement of Work and Power

Define the following terms:

- Work
- Power
- Ergometry/ergometer

Study Questions:

1. Define work and how it is calculated.
2. Define power and how it is calculated.
3. What SI units are commonly used to express mass, distance, time, force, work, energy, power, and velocity?
4. How do you convert body weight in pounds to body weight expressed in kilograms (kg)?
5. How do you convert height in inches to height expressed in centimeters (cm) and meters (m)?
6. Calculate work and power for bench stepping, cycle ergometry, and treadmill exercise.

Module 2- Measurement of Energy Expenditure

Define the following terms:

- Direct calorimetry
- Indirect calorimetry
- Open-circuit spirometry
- Metabolic equivalent (METs)
- Exercise efficiency
- Running economy

Study Questions:

1. Explain the differences between direct and indirect calorimetry.
2. What is open-circuit spirometry? How/why is this used?
3. How can oxygen consumption be used to estimate caloric expenditure?
4. Describe the difference in absolute vs relative oxygen consumption measurements.
5. How is energy cost/oxygen requirement calculated during treadmill walking and running?
6. How is energy cost/oxygen requirement calculated during cycling?
7. How can exercise efficiency be calculated?
8. What factors influence exercise efficiency? Explain.
9. What is running economy?