Powers and Howley EXERCISE PHYSIOLOGY: Theory and | **TEST**
Application to Fitness and Performance-10th edition | **BANK**

TEST BANK
Chapter 1
Common Measurements in Exercise Physiology

Multiple Choice Questions

Level 1 questions-Lowest level of difficulty questions (correct response requires remembering key information)

1. Work is defined as
A. the ability to transform energy from one state to another.
B. the ability to utilize oxygen.
C. the product of force times distance.
D. the product of distance times power output.

2. Power is defined as
A. the ability to perform work.
B. work divided by the amount of time required to perform the work.
C. the product of work times force (Work x force).
D. the product of force times distance (force x distance).

3. The SI unit for work is the
A. joule.
B. watt.
C. kpm.
D. kcal.

4. Direct calorimetry is a means of determining energy expenditure and involves the measurement of
A. oxygen consumption.
B. heat production.
C. ATP hydrolysis.
D. carbon dioxide production.

5. The energy cost of horizontal running can be estimated accurately because
A. the VO_2 of running is always the same.
B. the VO_2 of horizontal running is always 1 MET.
C. the VO_2 increases linearly with running speed.
D. none of the above answers are correct.

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6. The most common technique used to measure oxygen consumption in an exercise physiology laboratory is
A. closed-circuit spirometry.
B. open-circuit spirometry.
C. direct calorimetry.
D. computer calorimetry.

7. One MET is defined as a metabolic equivalent and is equal to
A. resting VO_2.
B. 50% of resting VO_2.
C. 200% of resting VO_2.
D. VO_2 max.

8. Net efficiency is defined as
A. work output/energy expended at rest times 100.
B. work output/energy expended above rest times 100.
C. work output/energy expended times 100.
D. energy expended/work output times 100.

9. Exercise efficiency is greater in subjects who
A. possess a higher percentage of fast muscle fibers.
B. possess a higher percentage of slow muscle fibers.
C. possess 50% fast fibers and 50% slow fibers.
D. None of the above answers are correct

10. Recent evidence suggests that the optimum speed of movement
A. increases as the power output increases.
B. decreases as the power output increases.
C. remains constant as the power output increases.
D. increases as the power output decreases.

11. The SI units used to describe power are
A. Newtons.
B. joules.
C. watts.
D. joules per second.

12. Net efficiency _____ as work rate increases.
A. increases
B. does not change
C. decreases
D. follows a sine wave pattern

13. A kilocalorie is equal to
A. 100 calories.
B. 1,000 calories.
C. 4,186 kilojoules.
D. 4.186 joules.

14. In order to standardize terms for the measurement of energy, power, work, etc., scientists have developed a common system of terminology called
A. the English system
B. the metric system
C. system international units (SI)
D. None of above answers are correct

15. The incline of a treadmill is expressed in units called percent grade. Percent grade is defined as
A. the angle of the treadmill expressed in degrees.
B. the amount of horizontal travel of the treadmill belt per minute.
C. the hypotenuse divided by the vertical rise.
D. the vertical rise per 100 units of belt travel.

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Level 2 questions-Moderate level of difficulty (correct response requires understanding and comprehending information)

16. Calculating the work performed on a cycle ergometer requires that you know all of the following *except*
A. subject's body weight.
B. resistance against flywheel.
C. pedaling speed (i.e., distance traveled).
D. exercise time.

17. A runner who exhibits poor running economy would require
A. a lower VO_2 at any given running speed compared to an economical runner.
B. a higher VO_2 at any given running speed compared to an economical runner.
C. the same VO_2 at any given running speed compared to an economical runner.
D. None of the above answers are correct.

18. The treadmill angle (expressed in degrees) can be determined by
A. Visual inspection of the angle of the treadmill.
B. trigonometric computations.
C. using a measurement device called an inclinometer.
D. Both B and C answers are correct

19. The measurement of oxygen consumption during exercise can provide an estimate of metabolic rate. The rationale behind the use of oxygen consumption to estimate metabolic rate is:
A. that measurement of oxygen consumption provides a direct estimate of how much carbohydrate is used a fuel source.
B. that a direct relationship exists between oxygen consumed and the amount of heat produced in the body.
C. that measurement of oxygen consumption provides a direct estimate of how much fat is used a fuel source.
D. None of the above answers are correct

20. During cycle ergometer exercise, net efficiency decreases as the work rate increases. The mechanism to explain this observation is
A. the relationship between energy expenditure and work rate is curvilinear rather linear.
B. the energy requirement of exercise decreases as work rate increases.
C. that oxygen consumption during exercise decreases over time.
D. None of the above answers are correct

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Level 3 questions -Highest level of difficulty (correct response requires applying and analyzing information)

21. Calculate the <u>power output</u> when an individual performs 600 joules of work in 60 seconds.
A. 10 watts
B. 660 watts
C. 36,000 watts
D. Power cannot be calculated with the information provided.

22. A subject performing a 10-MET activity would have an oxygen consumption of approximately
A. 10 ml•kg^{-1}•min^{-1}.
B. 25 ml•kg^{-1}•min^{-1}.
C. 35 ml•kg^{-1}•min^{-1}.
D. 45 ml•kg^{-1}•min^{-1}.

23. Calculate the <u>total amount of work</u> performed in 5 minutes of exercise on a cycle ergometer, given the following:
Resistance on flywheel = 30 Newtons
Cranking speed = 50 revolutions per minute
Distance traveled per revolution = 6 meters
1 joule = 1 newton-meter
A. 9,000 joules
B. 4500 joules
C. 45,000 joules
D. Total work performed cannot be calculated given the information above.

24. Compute the <u>power output</u> (watts) during one minute of treadmill exercise, given the following:
Treadmill grade = 10%
Horizontal speed = 100 meters per minute
Subject's body weight = 60 kg (i.e., force = 588.6 Newtons)
1 joule = 1 newton-meter
1 watt = 1 joule per second
1 kcal = 426.8 kpm
A. 98.1 watts
B. 981 watts
C. 9810 watts
D. Power output cannot be calculated given the information above.

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25. Calculate net efficiency, given the following:
Resting VO_2 = 0.25 liters per minute
Exercise VO_2 = 1. 50 liters per minute
Work rate = 100 watts (W) or 612 kilopond meters per minute
1 watt = 1 joule per second
1 kcal = 4186 joules
1 liter VO_2 = 5 kcal or 20,930 joules
A. approximately 19%
B. approximately 20%
C. approximately 23%
D. approximately 28%

All true/false questions are rated as Level 1 questions-Lowest level of difficulty questions (correct response requires remembering key information)

True / False Questions

26. Work equals power divided by time.
FALSE

27. The SI unit used for both work and energy is the joule.
TRUE

28. One MET equals resting oxygen consumption, which is approximately 5.3 ml•kg^{-1}•min^{-1}.
FALSE

29. The SI unit for time is the second
TRUE

30. The term ergometry refers to the measurement of work output.
TRUE