Chapter 01
Common Measurements in Exercise Physiology

Multiple Choice Questions

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

2. Power is defined as
A. the ability to perform work.
B. work divided by time.
C. work times force.
D. force times distance.

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

4. Calculate the power if 600 joules of work are completed in 60 seconds.
A. 10 watts
B. 660 watts
C. 36,000 watts
D. Power cannot be calculated with the information provided.

5. 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.
D. exercise time.

6. 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.

7. The energy cost of horizontal running can be estimated reasonably 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.

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

9. A 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.

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

11. Exercise efficiency is greater in subjects who
A. have a higher percentage of fast muscle fibers.
B. have a higher percentage of slow muscle fibers.
C. have 50% fast fibers and 50% slow fibers.

12. 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.

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

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

15. Net efficiency _____ as work rate increases.
A. increases
B. does not change
C. decreases

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

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.

True / False Questions

18. Work equals power divided by time.
FALSE

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

20. One MET equals resting oxygen consumption, which is approximately 5.3 $ml \bullet kg^{-1} \bullet min^{-1}$.
FALSE