Self-Help Quiz: AEET 102

CHAPTER 1: INTRODUCTION

1. Which of the following statements is **true** (only one):
   a. The growth rate of energy consumption has kept pace with GNP growth.
   b. Oil use has expanded more than any other fuel since 1940.
   c. We reached the point last year where we imported no oil.
   d. Electricity use has actually fallen since 1975.

2. Which of the following is a non-renewable resource?
   a. uranium b. water c. wind d. biomass e. radiant solar

3. Today, the U.S. imports about what percentage of the oil it uses?
   a. 10% b. 25% c. 40% d. 60% e. 80%

4. One of the primary motivating forces behind our per capita reduction in energy use in the 1980's was _____.
   a. a smaller population growth
   b. higher oil prices
   c. increased nuclear power costs
   d. increased domestic oil discoveries

5. The most significant aspect of world consumption of energy over the last 40 years has been the _____.
   a. growth of nuclear power
   b. expanding use of oil
   c. increased use of coal
   d. emphasis on energy conservation
   e. increase in our fossil fuel reserves

6. If you started with $100 in the bank and you had $200 after letting it sit there for 5 years, what would be the annual interest rate you received?
   a. 2% b. 5% c. 10% d. 14% e. 22%

7. Continued use of the fuels most relied upon in developing countries will eventually lead to _____.
   a. depletion of soil nutrients
   b. severe thermal pollution of water
   c. increased oil prices
   d. depletion of coal reserves in those countries

8. If the growth rate of the number of solar collectors is 7% per year, then 1000 units in use in 2010 will grow to _____ units by the year 2040.
   a. 1200 b. 2000 c. 4000 d. 8000 e. 20,000

9. The Hubbert curve for an energy resource displays what quantity on the y-axis?
   a. time b. total production c. yearly production d. amount of fuel left

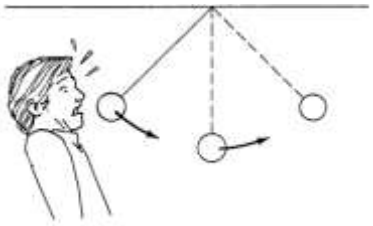
CHAPTERS 2 AND 3: ENERGY MECHANICS

10. A net force of 30 newtons is applied to a block of mass 10 kg. The force that must be applied to a block of mass 5 kg to give it equal acceleration is _____.
    a. 5 b. 10 c. 15 d. 20 e. 30 N

11. If a constant non—zero force is applied to an object, its velocity will certainly _____.
    a. change b. stop c. be zero d. be constant e. equal acceleration

12. Which of the following is a unit of energy:
    a. watt b. ft—lb/sec c. newton/sec. d. horsepower e. joule

13. Our nosecracker moved back and forth as shown. The kinetic energy will be greatest at point:



    a .A b. B c. C

14. For a fossil fueled electrical generating plant, 10,000 Btu of chemical energy into the plant will result in about how many Btu's of waste heat dumped into the environment:
    a. 0 b. 1000 c. 4000 d. 6000 e. 10,000 Btu's

15. If a net force of 30 newtons is applied to a cart of mass 3 kg at rest, the velocity of the cart at the end of 5 meters will be ____ m/s.
    a. 5 b. 10 c. 12 d. 25 e. 30

16. The cost of running a set of eight 100 watt light bulbs for 6 hours, with the cost of electricity at 9¢ per kWh, is approximately:
    a. 5¢ b. 24¢ c. 43¢ d. 54¢ e. 72¢

17. A 100 lb sack of potatoes falls from an airplane. As the velocity of fall increases, the air resistance also increases. When air resistance equals 100 lb, the acceleration of the sack will be ____ m/sec/sec.
    a. 0 b. 16 c. 32 d. 9.8 e. 24

18. Pumped storage facilities _____.
    a. increase the overall efficiency of a power plant
    b. make use of the output of electricity from photovoltaic cells
    c. are used to produce electricity mainly at night
    d. have an increase in their potential energy mainly at night
    e. cannot be used with a nuclear plant

19. If the energy conversion efficiencies in a 3 step process are 30% for the first step, 40% for the second, and 20% for the third, the overall efficiency (step one to end) is about:
    a. 2% b. 10% c. 20% d. 50% e. 90%

20. What is the minimum work that a motor must do to lift a 70 lb object from the floor to a height of 14 feet?
    a. 5 b. 70 c. 700 d. 980 e. 2010 ft-lbs

21. If the push that you give to a bike is the action force, then the reaction force is _____.
    a. the force of the bike upon you
    b. the weight of the bike
    c. the friction force on the tires
    d. the acceleration of the bike
    e. air resistance on the bike

22. If the height of water behind a dam is increased by a factor of two, then the maximum kinetic energy of the water at the bottom of the dam will increase by a factor of _____.
    a. one b. two c. four d. zero

23. The net force required to move a body at a constant velocity in outer space is _____.
    a. zero
    b. its weight
    c. the force of gravity
    d. its mass times its velocity
    e. the force of friction

24. A force applied to an object will always cause the object to
    a. speed up
    b. accelerate
    c. change its momentum
    d. all of the above
    e. none of the above

25. If you shout across a canyon and the echo returns in four seconds, how far away is the other side? (Velocity of sound in air is 300 m/s).
    a. 150 b. 300 c. 600 d. 1200 e. 2400 meters

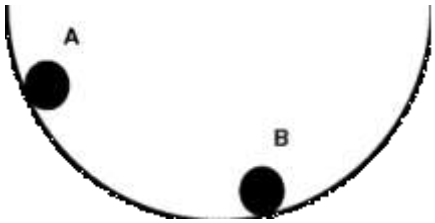
26. Power is defined as _____.
    a. the energy used times the time
    b. the work done times the distance of motion
    c. the energy used divided by the work
    d. the rate of converting energy
    e. the ability to do work

27. If a 60 kg person is observed to accelerate at a rate of 4 m/sec/sec, the net force responsible for this is:
    a. 600 N b. 240 N c. 30 N d. the force of gravity e. 480 N

28. The "efficiency" of a light bulb is the ratio of the:
    a. heat plus electricity produced to the electrical input
    b. voltage output of the bulb to the power input
    c. energy into the bulb to the energy out of the bulb
    d. light output to the electrical energy input

29. A ball rolls back and forth on the track shown. The kinetic energy at position A will be _____ than that at position B.

    a. greater b. smaller c. the same as



30. The reason that you would use a ramp to carry a weight to the top of a platform, rather than lifting it up a ladder, is because the
    a. force exerted would be less
    b. work done would be less
    c. power expended would be less
    d. gain in potential energy would be more

31. How much work is required to increase the velocity of a 4 kg car from rest to 5 m/sec?
    a. 10 b. 20 c. 50 d. 100 e. 200 Joules

32. When a car is braked to a stop, its kinetic energy is transformed into
    a. stopping energy
    b. potential energy
    c. heat energy
    d. energy of motion

33. If the same force is applied to a 2 kg object as to a 1 kg one, _____.
    a. the velocity of the 2 kg object will be greater after 2 sec.
    b. the distance traveled in the same time will be more for the 1 kg object
    c. the acceleration of the larger object will be more
    d. the acceleration of the 1 kg object will be 4 times more

34. A sheet of paper can be withdrawn from under a bottle of milk without toppling the bottle if the paper is jerked out quickly. This is an example of _____.
    a. inertia
    b. action-reaction
    c. potential energy
    d. friction forces

35. Which of the following is a unit of power?
    a. Btu
    b. kilowatt
    c. kilowatt-hour
    d. joule
    e. horsepower per hour