McRoberts Secondary

Energy Unit Test 2025-12-01

Personal Data

Family Name:

Given Name:

Signature:

checked

Registration Number

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9	☐	☐	☐	☐	☐	☐	☐	9

In this section **no** changes or modifications must be made!

Scrambling 0 0

Type: 020

Exam ID(Physics 11): 25120100001

Please mark the boxes carefully: ☒ Not marked: ☐ or ■

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Only clearly marked and positionally accurate crosses will be processed!

Answers 1 - 15

	a	b	c	d
1	☐	☐	☐	☐
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13	☐	☐	☐	☐
14	☐	☐	☐	☐
15	☐	☐	☐	☐
	a	b	c	d

Answers 16 - 20

	a	b	c	d
16	☐	☐	☐	☐
17	☐	☐	☐	☐
18	☐	☐	☐	☐
19	☐	☐	☐	☐
20	☐	☐	☐	☐
	a	b	c	d

1. An object of mass 74.0 kg is moving with speed 5.00 m/s. What is its kinetic energy?

    a. 1250 J
    b. 925 J
    c. 1370 J
    d. 1050 J

2. An object of mass 81.0 kg is 8.00 m above the ground. What is its gravitational potential energy relative to the ground?

    a. 5670 J
    b. 4990 J
    c. 6350 J
    d. 4140 J

3. Which of the following are units of energy? *Select all that apply.*

    a. $\mathrm{kg\,m^2\,s^{-2}}$
    b. $\mathrm{kg\,m^2\,s^2}$
    c. $\mathrm{kg\,m\,s^{-2}}$
    d. J

4. Dave pushes against a brick wall for 10 seconds. Mary pushes against the same wall for 20 seconds. The wall does not move. Compare the work done by each person.

    a. Mary does 2 times as much work as Dave.
    b. Mary does 10 seconds more work than Dave.
    c. The work done by each person depends on the force they applied.
    d. Both Dave and Mary do no work.

5. A cyclist going down a hill wants to shift gears to decrease his bicycle's mechanical advantage. This would make it so that he can exert a greater effort force on the bike. Which sprocket changes would result in a smaller mechanical advantage? *Select all that apply.*

    a. increase front sprocket radius.
    b. increase rear sprocket radius.
    c. decrease front sprocket radius.
    d. decrease rear sprocket radius.

6. A pulley system lifts a 1603-N weight a distance of 3.1 m. Paul pulls the rope a distance of 21.3 m, exerting a force of 382 N. What is the efficiency of the system?

    a. 61.1 %
    b. 96.8 %
    c. 18.5 %
    d. 85.8 %

7. An elevator is moving upwards at a constant speed of 2.77 m/s. The total mass of the elevator and passengers is 1460 kg. How much power is developed by the elevator's motor?

    a. 22.9 kW
    b. 57.3 kW
    c. 43.9 kW
    d. 39.6 kW

8. A box is pushed up an inclined plane. The angle of incline is 40° from the ground. What is the ideal mechanical advantage of the inclined plane?

    a. 2.330
    b. 2.150
    c. 1.560
    d. 1.780

9. How much power is required to lift a box of mass 26 kg a distance of 8.0 m straight up in 23.0 s?

    a. 118 W
    b. 88.6 W
    c. 131 W
    d. 109 W

10. How much work is done (by you) if you raise a 6.0 N weight 9.0 m above the ground?

    a. 54.0 J
    b. 23.0 J
    c. 529.2 J
    d. 0.0 J

11. A rope is used to pull a box 5.0 m across the floor. The rope is held at an angle of 49.0° with the floor and a force of 342 N is used. The mass of the box is 78 kg and the coefficient of kinetic friction between the box and the ground is 0.92. How much work does the force on the rope do?

    a. 1120 J
    b. 1510 J
    c. 1140 J
    d. 1710 J

12. How much work does the force of gravity do when a 15.0-kg object falls a distance of 17.6 m?

    a. 2590 J
    b. 3370 J
    c. 0 J
    d. 264 J

13. A simple machine with mechanical advantage less than 1

    a. increases friction.
    b. increases energy.
    c. increases effort force.
    d. decreases effort force.

14. A ball drops some distance and loses 53 J of gravitational potential energy. Do **NOT** ignore air resistance. How much kinetic energy did the ball gain?

    a. More than 53 J.
    b. Exactly 53 J.
    c. Less than 53 J.
    d. Cannot be determined.

15. The transfer of energy by mechanical means is

    a. force
    b. momentum
    c. work
    d. acceleration

16. A 1007-kg car is traveling at 28 m/s. The brakes are suddenly applied and the car slides to a stop. The average braking force between the tires and the road is 5006 N. How far will the car slide once the brakes are applied?

    a. 68.4 m
    b. 78.8 m
    c. 88.9 m
    d. 42.7 m

17. A car moving at 53 km/h comes to a stop in 13 m after the driver applies the brakes. How far would the same car take to stop if it were moving at 94 km/h? Assume identical road conditions and braking force.

    a. 25.4 m
    b. 51.3 m
    c. 46.5 m
    d. 40.9 m

18. The net work done on an object is equal to its

    a. change in kinetic energy.
    b. change in potential energy.
    c. change in velocity.
    d. change in total mechanical energy.

19. A test rocket of mass 58 kg is fired straight up. Its fuel gives it a kinetic energy of 9292 J by the time the rocket engine burns all the fuel. What additional height will the rocket rise?

    a. 12.7 m
    b. 8.33 m
    c. 16.3 m
    d. 14.5 m

20. Ollie's mass is 12.0 kg. He climbs the 8.9-m ladder of a slide, and reaches a velocity of 2.6 m/s at the bottom. How much work was done by friction on Ollie?

    a. 1430 J
    b. 816 J
    c. 1010 J
    d. 1230 J