McRoberts Secondary

Energy Unit Retest 2025-01-20

Personal Data

Family Name:

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Registration Number

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1 ☐☐☐☐☐☐☐ 1
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In this section **no** changes or modifications must be made!

Scrambling 0 0

Type: 020

Exam ID(Physics 11): 25012000002

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	☐	☐	☐	☐
2	☐	☐	☐	☐
3	☐	☐	☐	☐
4	☐	☐	☐	☐
5	☐	☐	☐	☐
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10	☐	☐	☐	☐
11	☐	☐	☐	☐
12	☐	☐	☐	☐
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 20.0 kg is moving with speed 7.00 m/s. What is its kinetic energy?

   a. 541 J
   b. 733 J
   c. 605 J
   d. 490 J

2. An object of mass 49.0 kg is 10.00 m above the ground. What is its gravitational potential energy relative to the ground?

   a. 4800 J
   b. 3120 J
   c. 3650 J
   d. 2450 J

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

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

4. The transfer of energy by mechanical means is

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

5. A cyclist climbing up a hill wants to shift gears to increase his bicycle's mechanical advantage. This would make it so that a smaller effort force is needed to overcome the force of gravity on the bike. Which sprocket changes would result in a greater 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 1939-N weight a distance of 0.733 m. Paul pulls the rope a distance of 9.59 m, exerting a force of 165 N. What is the efficiency of the system?

   a. 89.8 %
   b. 67.4 %
   c. 86.6 %
   d. 65.7 %

7. An elevator is moving upwards at a constant speed of 3.5 m/s. The total mass of the elevator and passengers is 1581 kg. How much power is developed by the elevator's motor?

   a. $54.2\,\mathrm{kW}$
   b. $80.8\,\mathrm{kW}$
   c. $74.6\,\mathrm{kW}$
   d. $68.3\,\mathrm{kW}$

8. A box is pushed up an inclined plane. The angle of incline is 37° from the ground. What is the ideal mechanical advantage of the inclined plane?

    a. 1.660
    b. 1.270
    c. 1.470
    d. 0.880

9. How much power is required to lift a box of mass $38\,\mathrm{kg}$ a distance of $13.0\,\mathrm{m}$ straight up in $29.0\,\mathrm{s}$?

    a. $227\,\mathrm{W}$
    b. $191\,\mathrm{W}$
    c. $88.7\,\mathrm{W}$
    d. $167\,\mathrm{W}$

10. How much work is done (by you) if you raise a 1.0 N weight 5.0 m above the ground?

    a. 0.0 J
    b. 49.0 J
    c. 5.0 J
    d. 21.4 J

11. A rope is used to pull a box $11.0\,\mathrm{m}$ across the floor. The rope is held at an angle of 28.0° with the floor and a force of $355\,\mathrm{N}$ is used. The mass of the box is $70\,\mathrm{kg}$ and the coefficient of kinetic friction between the box and the ground is 0.34. How much work does the force on the rope do?

    a. $3900\,\mathrm{J}$
    b. $3450\,\mathrm{J}$
    c. $1820\,\mathrm{J}$
    d. $2790\,\mathrm{J}$

12. How much work does the force of gravity do when a 25.0-N object falls a distance of 15 m?

    a. 3680 J
    b. 899 J
    c. 115 J
    d. 375 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 gains 16 J of kinetic energy. Do **NOT** ignore air resistance. How much gravitational potential energy did the ball lose?

    a. More than 16 J.
    b. Exactly 16 J.
    c. Less than 16 J.
    d. Cannot be determined.

15. A 1911-kg car is traveling at 14 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 5453 N. How far will the car slide once the brakes are applied?

    a. 50.3 m
    b. 17.2 m
    c. 34.3 m
    d. 30.0 m

16. A car moving at 47 km/h comes to a stop in 67 m after the driver applies the brakes. How far would the same car take to stop if it were moving at 100 km/h? Assume identical road conditions and braking force.

    a. 152.8 m
    b. 271.8 m
    c. 303.3 m
    d. 197.9 m

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

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

18. An electric motor develops 12.0 kW of power as it lifts a loaded elevator up a distance of 26.0 m. The total mass of the elevator and passengers is 3175 kg. How long does the elevator take to complete complete this trip?

    a. 76.5 s
    b. 47.5 s
    c. 67.4 s
    d. 91.8 s

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. 10.2 m
    b. 16.3 m
    c. 8.3 m
    d. 12.5 m

20. Yuki's mass is 62.0 kg. He climbs the 4.5-m ladder of a slide, and reaches a velocity of 3.4 m/s at the bottom. How much work was done by friction on Yuki?

    a. 3560 J
    b. 3280 J
    c. 2380 J
    d. 2690 J