

Name: _____

1. A jack exerts a force of 4,500 newtons to raise a car 0.25 meter. What is the approximate work done by the jack?

- A. 5.6×10^{-5} J
- B. 1.1×10^3 J
- C. 4.5×10^3 J
- D. 1.8×10^4 J

2. A block weighing 15 newtons is pulled to the top of an incline that is 0.20 meter above the ground, as shown below.



If 4.0 joules of work are needed to pull the block the full length of the incline, how much work is done against friction?

- A. 1.0 J
- B. 0.0 J
- C. 3.0 J
- D. 7.0 J

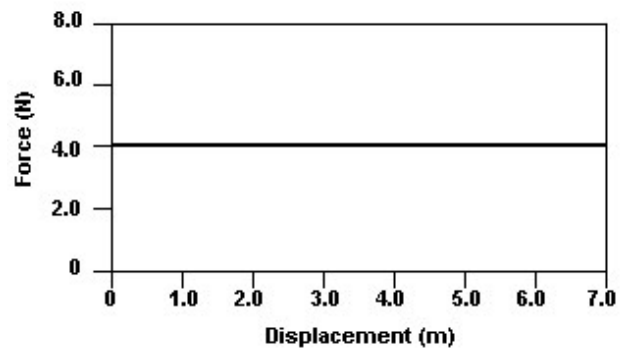
3. If the time required for a student to swim 500 meters is doubled, the power developed by the student will be

- A. halved
- B. doubled
- C. quartered
- D. quadrupled

4. What is the maximum distance that a 60.-watt motor may vertically lift a 90.-newton weight in 7.5 seconds?

- A. 2.3 m
- B. 5.0 m
- C. 140 m
- D. 1100 m

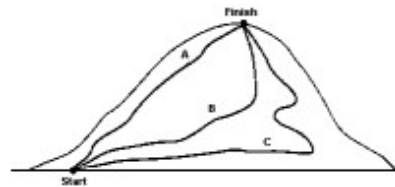
5. The graph shows the force exerted on a block as a function of the block's displacement in the direction of the force.



How much work did the force do in displacing the block 5.0 meters?

- A. 0 J
- B. 20. J
- C. 0.80 J
- D. 4.0 J

6. Three people of equal mass climb a mountain using paths A, B, and C shown in the diagram.



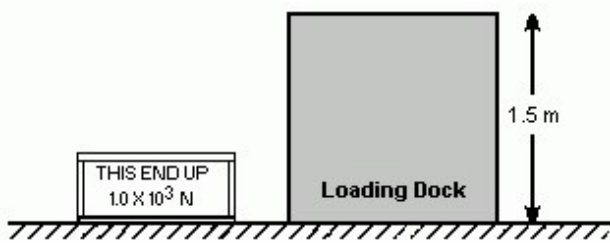
Along which path(s) does a person gain the greatest amount of gravitational potential energy?

- A. A, only
- B. B, only
- C. C, only
- D. The gain is the same along all paths.

7. A 10.-newton force is required to move a 3.0-kilogram box at a constant speed. How much power is required to move the box 8.0 meters in 2.0 seconds?

- A. 40. W
- B. 20. W
- C. 15 W
- D. 12 W

8. The diagram shows a 1.0×10^3 -newton crate to be lifted at constant speed from the ground to a loading dock 1.5 meters high in 5.0 seconds.



What power is required to lift the crate?

- A. 1.5×10^3 W
- B. 2.0×10^2 W
- C. 3.0×10^2 W
- D. 7.5×10^3 W

9. A 45-kilogram bicyclist climbs a hill at a constant speed of 2.5 meters per second by applying an average force of 85 newtons. Approximately how much power does the bicyclist develop?

- A. 110 W
- B. 210 W
- C. 1100 W
- D. 1400 W

10. As the time required to do a given quantity of work decreases, the power developed

- A. decreases
- B. increases
- C. remains the same

11. In raising an object vertically at a constant speed of 2.0 meters per second, 10. watts of power is developed. The weight of the object is

- A. 5.0 N
- B. 20. N
- C. 40. N
- D. 50. N

12. How much work is done on a downhill skier by an average braking force of 9.8×10^2 newtons to stop her in a distance of 10. meters?

- A. 1.0×10^1 J
- B. 9.8×10^1 J
- C. 1.0×10^3 J
- D. 9.8×10^3 J

13. Work is being done when a force

- A. acts vertically on a cart that can only move horizontally
- B. is exerted by one team in a tug of war when there is no movement
- C. is exerted on a wagon while pulling it up a hill
- D. of gravitational attraction acts on a person standing on the surface of the Earth

14. A 6.0×10^2 -newton man climbing a rope at a speed of 2.0 meters per second develops power at the rate of

- A. 1.2×10^1 W
- B. 6.0×10^2 W
- C. 3.0×10^2 W
- D. 1.2×10^3 W

15. Which action would require no work to be done on an object?

- A. lifting the object from the floor to the ceiling
- B. pushing the object along a horizontal floor against a frictional force
- C. decreasing the speed of an object until it comes to rest
- D. holding the object stationary above the ground

16. A student does 300. joules of work pushing a cart 3.0 meters due east and then does 400. joules of work pushing the cart 4.0 meters due north. The total amount of work done by the student is

- A. 100. J
- B. 500. J
- C. 700. J
- D. 2500 J

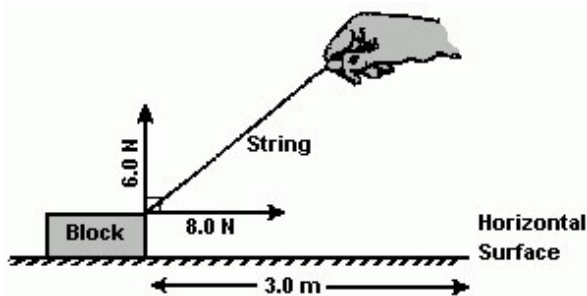
17. A motor has an output of 1,000 watts. When the motor is working at full capacity, how much time will it require to lift a 50-newton weight 100 meters?

- A. 5 s
- B. 10 s
- C. 50 s
- D. 100 s

18. A 5.0×10^2 -newton girl takes 10. seconds to run up two flights of stairs to a landing, a total of 5.0 meters vertically above her starting point. What power does the girl develop during her run?

- A. 25 W
- B. 50. W
- C. 250 W
- D. 2,500 W

19. A student pulls a block 3.0 meters along a horizontal surface at constant velocity. The diagram shows the components of the force exerted on the block by the student.



How much work is done against friction?

- A. 18 J
- B. 24 J
- C. 30. J
- D. 42 J

20. A net force of 5.0 newtons moves a 2.0-kilogram object a distance of 3.0 meters in 3.0 seconds. How much work is done on the object?

- A. 1.0 J
- B. 10. J
- C. 15 J
- D. 30. J

21. A constant force of 1900 newtons is required to keep an automobile having a mass of 1.0×10^3 kilograms moving at a constant speed of 20. meters per second. The work done in moving the automobile a distance of 2.0×10^3 meters is

- A. 2.0×10^4 J
- B. 3.8×10^4 J
- C. 2.0×10^6 J
- D. 3.8×10^6 J

Answer Key for WORK/POWER QUEST

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|------|-------|-------|
| 1. B | 8. C | 15. D |
| 2. A | 9. B | 16. C |
| 3. A | 10. B | 17. A |
| 4. B | 11. A | 18. C |
| 5. B | 12. D | 19. B |
| 6. D | 13. C | 20. C |
| 7. A | 14. D | 21. D |