

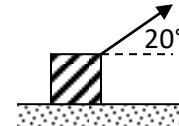
Topic 2.3 – Work, energy and power

Formative Assessment

NAME: _____ TEAM: _____

THIS IS A PRACTICE ASSESSMENT. Show formulas, substitutions, answers (in spaces provided) and units!

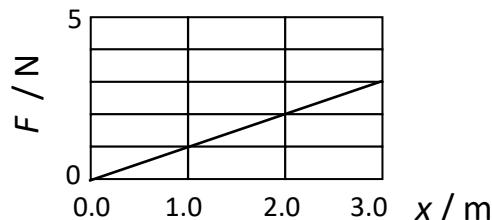
- An 860-kg Smart Car has an acceleration of 0.75 ms^{-2} . What is the work done by the net force acting on the car if it travels 45 meters? 1. _____



- What is the work done by the 200-N tension shown if it is used to drag the 150-N crate 25 m across the floor at a constant speed? 2. _____

A variable force, shown in the graph below, acts on a 2.5-kg mass which is initially at rest.

- What is the work done by the variable force whose from $x = 1.0$ to $x = 3.0 \text{ m}$? 3. _____



- What is the kinetic energy of the mass at the position $x = 3.0 \text{ m}$? 4. _____

- What is the speed of the mass at the position $x = 3.0 \text{ m}$? 5. _____

The Smart Car shown in the picture has speed and mass as shown.

- What is the kinetic energy of the car at this moment?



- If the driver suddenly applies the brakes and brings the car to a stop in 3.0 s, what is the work done by the friction force between the tires and the road surface? 7. _____

- What is the average friction force during the braking action? 8. _____

- Suppose the car drives up a hill whose altitude is 16 m above the car's starting point. What is the change in potential energy of the car in going up the hill from its starting point? 9. _____

10. If the car in the previous problem begins to slide down the ice-covered and (magically) frictionless hill, what will its speed be when it is at an altitude of 8.0 m? 10. _____

11. What will its speed be when it reaches the bottom of the hill? 11. _____



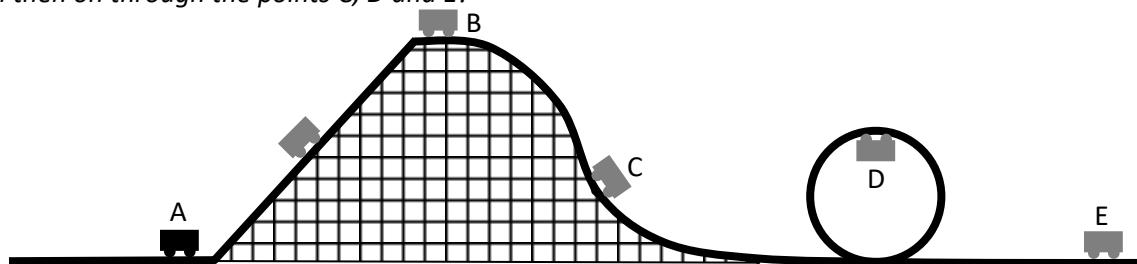
A Smart Car accelerates from rest as shown.

12. If the constant acceleration occurs over a distance of 30. m, what is the work done by the car in accelerating itself? 12. _____

13. How long does the acceleration take? 13. _____

14. What, then, is the average output power produced by the engine during the acceleration? 14. _____

The Goliath is a new wooden roller coaster that allows the riders to go upside-down on the loop shown below. The starting height of the coaster is 95.6 m. The radius of the loop is 24.4 m. Riders board the cars at A. The car is drawn by a chain up to the point B and then released from rest. Gravity does everything from then on through the points C, D and E!



15. What is the change in potential energy of a typical loaded car having a total mass of 1520 kg as the chain pulls it from A to B? 15. _____

16. What is the kinetic energy of the car at D? 16. _____

17. What is the speed of the car at D? 17. _____

18. What is the kinetic energy of the car at E? 18. _____

19. What is the speed of the car at E? 19. _____