Name:_____ Score: 20

Regents Physics

Worksheet 1.1.4 – Distance and Timeless Equations (20 points)

Show all work – multiple choice answers MUST be proven for full credit!

1. An object begins from rest and accelerates at a rate of 2.5 meters per second^2 for 6.0 seconds.

   a. Calculate the distance that the object will travel.

   [45 m]

   b. Determine the final speed of the object.

   [15 m/s]

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2. A block starts from rest and begins sliding down an incline. The block reaches a speed of 12 meters per second as it slides a distance of 50 meters.

   a. Calculate the block's rate of acceleration.

   [1.4 m/s^2]

   b. Calculate the time for which the block slides.

   [8.3 s]

3. A jogger moving at +2.4 meters per second accelerates at a rate of +1.6 meters per second^2 while traveling +5.0 meters.

   a. Calculate the jogger's speed at the end of these 5.0 meters.

   [4.7 m/s]

   b. Calculate the time that it takes the jogger to travel these 5.0 meters.

   [1.4 s]

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4. A skater increases her speed uniformly from 2.0 meters per second to 7.0 meters per second over a distance of 12 meters. The magnitude of her acceleration as she travels this 12 meters is

   (1) 1.9 m/s^2 (3) 2.4 m/s^2

   (2) 2.2 m/s^2 (4) 3.8 m/s^2

Proof: Show calculation.

5. A boat initially traveling at 5.0 meters per second accelerates uniformly at the rate of 2.5 meters per second^2 for 8.2 seconds. How far does the boat travel during this time?

(1) 25 m
(2) 125 m
(3) 175 m
(4) 250 m

Proof: Show calculation.

6. A truck rolls 3.0 kilometers while changing its speed from 5.0 meters per second to 18.0 meters per second. At what rate did the truck accelerate?

(1) 5.8×10^2 m/s^2
(2) 5.0×10^2 m/s^2
(3) 5.8×10^{-2} m/s^2
(4) 5.0×10^{-2} m/s^2

Proof: Show calculation.

7. A ball starting from rest accelerates uniformly at 4.0 meters per second^2 as it rolls 60 meters down an incline. How much time is required for the ball to roll the 60 meters?

(1) 3.8 s
(2) 5.4 s
(3) 7.6 s
(4) 10.8 s

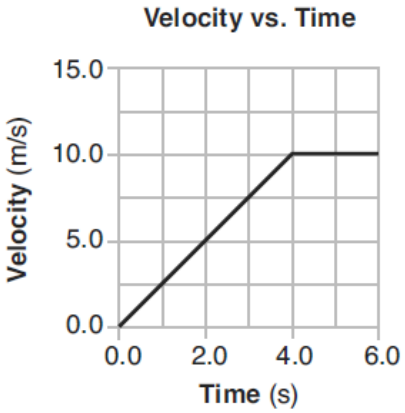
Proof: Show calculation.

8. An object begins from rest and accelerates at rate A while traveling a distance D. Which of the following equations correctly expressed the object's time of travel in terms of A and D?

(1) $\sqrt{\frac{D}{A}}$
(2) $\sqrt{\frac{2D}{A}}$
(3) $\sqrt{\frac{A}{D}}$
(4) $\sqrt{\frac{D}{2A}}$

Proof: Demonstrate solution.

Base your answer to question 9 on the graph below, which represents the motion of a car during a 6.0 second time interval.



9. What is the acceleration of the car at t = 5.0 seconds?

(1) 0.0 m/s^2
(2) 2.0 m/s^2
(3) 2.5 m/s^2
(4) 10. m/s^2

Proof: Show calculation or explain.