Physics 2311. Mechanics of Solids

Exam-like questions on "1-D Motion" (Ch. 2) Name:_____

1. **If Mo runs 10 m right, 15 m left, and 20 m right in 60 seconds, what was his average velocity?**

   (a) 0.75 m/s left (b) 0.75 m/s right (c) 0.25 m/s right (d) 0.25 m/s left (e) 15. m/s right

2. **Which of the following always holds true, even if acceleration is not uniform? (Note: all hold true in the case of uniform acceleration.)**

   (a) $v = at + v_0$

   (b) $v_{avg} = \frac{\Delta x}{\Delta t}$

   (c) $x = \frac{1}{2}at^2 + v_0 t + x_0$

   (d) $v_f^2 - v_i^2 = 2a(x_f - x_i)$

   (e) $x_f = x_i + \frac{v_i + v_f}{2}\Delta t$

3. **A truck slams on its brakes when its speed is 42 m/s and skids to a stop with an acceleration of -5 m/s^2. Which of these single equations can you use to find the length of the skid?**

   (a) $v = at + v_0$

   (b) $v_{avg} = \frac{\Delta x}{\Delta t}$

   (c) $x = \frac{1}{2}at^2 + v_0 t + x_0$

   (d) $v_f^2 - v_i^2 = 2a(x_f - x_i)$

   (e) $x_f = x_i + \frac{v_i + v_f}{2}\Delta t$

4. **A truck slams on its brakes when its speed is 42 m/s and skids to a stop with an acceleration of -5 m/s^2. Find the length of the skid.**

   (a) 74 m (b) 210 m (c) 150 m (d) -175 m (e) 180 m

5. **A rock is dropped from rest into a well. The acceleration is 9.8 m/s^2 downward. How fast is the rock moving in 3.2 seconds?**

   (a) 19.6 m/s (b) 21 m/s (c) 31 m/s (d) 42 m/s (e) 100 m/s

6. **A rock is dropped from rest into a well. The acceleration is 9.8 m/s^2 downward. How far has the rock fallen in 3.2 seconds?**

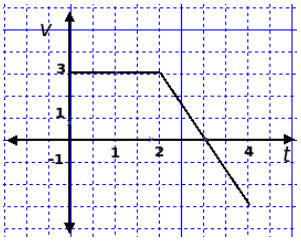
   (a) 50 m (b) 60 m (c) 31 m (d) 72 m (e) 21 m

7. **How long does it take for a catapulted human to reach their highest point if they are shot straight upward at 50 m/s? (Assume a=9.8 m/s^2 down, and neglect air resistance.).**

   (a) 1.5 s (b) 2.2 s (c) 4.1 s (d) 4.9 s (e) 5.1 s

8. **A car to the right of the origin is driving to the left and speeding up. If we plot the motion on an x-axs which increases to the right, the signs of its position, velocity and acceleration are _____, respectively.**

   (a) -,+,and + (b) +,-,and + (c) -,-, and + (d) +,-, and - (e) +,+, and -



9. **Based on the velocity vs time graph (above), what is the objects' velocity at t=3 seconds?**

   (a) -3 m/s (b) -1 m/s (c) 0 (d) 3 m/s (e) 5 m/s

10. **Based on the velocity vs time graph, what is the objects' acceleration at t=3 sec?**

    (a) -3 m/s^2 (b) -1 m/s^2 (c) 0 (d) 3 m/s^2 (e) 5 m/s^2

11. **Based on the velocity vs time graph, what is the objects' displacement from t=0 to 3 s?**

    (a) 2 m (b) 6 m (c) 7.5 m (d) 9 m (e) 11 m

12. **Based on the velocity vs time graph, what is the objects' displacement from t=2 to 4 s?**

    (a) 0 m (b) 2 m (c) 4 m (d) 6 m (e) 8 m