

## Chapter 2 (Motion along a strait line)

1- A car starts from rest and moves with uniform increasing rate  $2.0 \text{ m/s/s}$  in a straight line until reaches a speed of  $20 \text{ m/s}$ . The car then slows down at a constant rate of  $1.0 \text{ m/s/s}$  until it stops. How much time elapses (total time) from start to stop? (A: **30 s**)

2- A particle moves along the x-axis according to the equation:

$$x = 5.0 t + 10 t^2$$

where x is in m and t is in s. Calculate the instantaneous velocity of the particle at  $t = 3\text{s}$ . (A: **110 m/s**)

3- A balloon carrying a package is ascending (going vertically upward) at a uniform rate of  $12 \text{ m/s}$ . When it is  $80 \text{ m}$  above the ground the package is released. How long does the package take to reach the ground? (A: **5.4 s**)

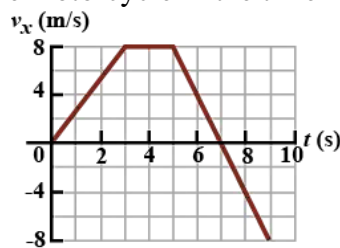
4- The position of a particle moving along the x axis is described by the equation

$$x(t) = 5.0 + 2.0 t + t^3$$

Find its average acceleration for the time interval  $t = 1.0 \text{ s}$  to  $t = 2.0 \text{ s}$ . (A: **9.0 m/s<sup>2</sup>**)

5- A racing car traveling with constant acceleration increases its speed from  $10 \text{ m/s}$  to  $30 \text{ m/s}$  over a distance of  $80 \text{ m}$ ? How long does this take? (A: **4.0 s**)

6- A student drives a motorcycle along a straight road as described by the velocity-time graph in **Figure**. What is the total distance covered by the motorcycle in the time interval from 0 to 9 s? (A: **44 m**)



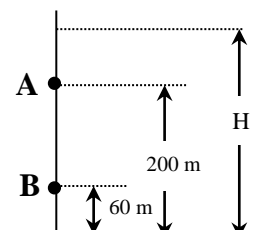
7- An object is thrown vertically upward at  $35 \text{ m/s}$ . Taking  $g = 10 \text{ m/s}^2$ , the velocity of the object after 5 seconds later is: (A: **15 m/s downward**)

8- A stone is thrown vertically upward with an initial speed of  $19.5 \text{ m/s}$ . It will rise to a maximum height of: (A: **19.4 m**)

9- A stone is released from rest from the edge of a building  $190 \text{ m}$  above the ground. Neglecting air resistance, the speed of the stone, just before striking the ground, is: (A: **61 m/s**)

10- A stone is thrown from the top of a building with an initial vertical velocity of  $20 \text{ m/s}$  **upward/downward**. The top of the building is  $60 \text{ m}$  above the ground. How much time needed to impact with ground? (A: for **upward: 6.1s**, for **downward: 2s**)

11- An object is released from rest at a height H. It takes  $2.00 \text{ s}$  for the object to fall from point A to point B (see the Figure). What is the initial height H? (A: **385 m**)



## Summary of Chapter 2 topics

- 1- Understanding the rest, constant velocity, constant acceleration topics in the motion?
- 2- Understanding constant acceleration problems and the initial direction?
- 3- Understanding free fall problems and the initial direction?
- 4- Understanding graphical integration problems?