MRUA 2015-2106 Class Problems

1 .- A body moves from rest with constant acceleration of 8 ms^{-2}. Calculate: a) its velocity after 5 s b) the distance travelled from rest, after 5 s.

2 .- The velocity of a vehicle increases smoothly from 15 kmh^{-1} to 60 kmh^{-1} in 20 s. Calculate a) the average speed in kmh^{-1}; in ms^{-1}, b) acceleration c) the distance in meters covered during this time.

3 .- A vehicle traveling at a speed of 15 ms^{-1}, increases its speed by 1 ms^{-1}, every second. a) Calculate the distance covered in 6 s. b) If it decelerates (slows down) at 1 ms^{-1}, each second, calculate the distance covered in 6 s and then the time it would take to stop.

4 .- A car is travelling at a speed of 45 kmh^{-1}, the brakes are applied and after 5 s the speed has been reduced to 15 kmh^{-1}. Calculate a) the acceleration b) distance travelled for the five seconds of deceleration.

5 .- The speed of a train is reduced uniformly from 12 ms^{-1} to 5 ms^{-1}. If you are told that during this time the train travels a distance of 100 m, calculate a) the acceleration b) how far the train would travel to a stop if we assume the same deceleration.

6 .- A body that has a velocity of 10 ms^{-1} accelerates at 2 ms^{-2}. Calculate: a) The increase in speed after 1 min. b) The speed at the end of the first minute. c) The average speed during the first minute. d) The displacement after 1 minute.

7 .- A body that has a velocity of 8 ms^{-1} accelerates uniformly so that it travels 640 m in 40 s. Calculate: a) The average velocity for the 40 s. b) The final speed. c) acceleration.

8 .- A car starts from rest with constant acceleration of 5 ms^{-2}. Calculate its speed after 4 s and how far it travels.

9 .- A body is falling down an inclined plane with constant acceleration from rest. After 3 s the speed acquired is 27 ms^{-1}, calculate the speed and distance travelled 6 s after starting the movement.

10 .- A body starts from rest with constant acceleration and after covering 250 m, its velocity is 80 ms^{-1}. Calculate the acceleration.

11 .- The speed with which a projectile shoots out of a canon is 600 ms^{-1}. Knowing that the barrel length is 150 cm, calculate the average acceleration of the projectile while it is in the canon.

12 .- A car increases its speed uniformly from 20 ms^{-1} to 60 ms^{-1}, while driving 200 m. Calculate the acceleration and the time it takes to do this.

13 .- A plane travels, before take-off, a distance of 1,800 m in 12 s with constant acceleration. Calculate: a) acceleration, b) the speed at take-off, c) the distance traveled during the first and the twelfth second.

14 .- A train has a velocity of 60 kmh^{-1} comes to a halt and in 44 s, it stops. Calculate the acceleration and the distance it travels until it stops.

15 .- A body with a speed of 40 ms^{-1}, decreases velocity uniformly at the rate of 5 ms^{-2}. Calculate: a) the velocity after 6 s, b) the average speed during the 6 s, c) the distance covered in 6 s.

16 .- A spacecraft moves in free space with a constant acceleration of 9.8 ms^{-2}. a) If it departs from zero ms^{-1} how long will it take to acquire a speed of one tenth of the speed of light, b) how far will it travel during this time? (speed of light = 3x108 ms^{-1})

17 .- A jet lands with a speed of 100 ms^{-1} and can accelerate to a maximum rate of - 5 ms^{-2} when it will stop. a) From the moment it touches the runway, what is the minimum time required before it stops?, b) can the aircraft land on a runway with a length of 0.8 km?