Class 11   Time : 1 hr.
8-8-2016   Second Unit Test (First Term) in PHYSICS   M. Marks : 20

1.   Draw the position-time graph for two objects moving along straight line in positive x
        direction with their relative velocity positive.   (1)

2.   Under what condition the average velocity of the object is equal to the
        instantaneous velocity?   (1)

3.   Using calculus method, derive the following equation:
        $S = ut + \frac{1}{2}at^2$, where the symbols have their usual meanings.   (2)

4.   An object is thrown vertically upwards with certain velocity and then caught by the
        thrower after some time. Sketch velocity - time graph and the corresponding
        position -time graph.   (2)

5.   On a 60km track, a train travels the first 30km with uniform speed of 30km/h. How fast
        must the train travel the next 30km so as to have average speed of 40km/h for
        the entire trip?   (2)

6.   Derive the relation:

        $S_{nth} = u + \frac{a}{2}(2n-1)$

        Where S_{nth} is the distance travelled in nth second.   (2)

7.   Two buses A and B are at positions 50m and 100m from the origin at time t=0. They
        start moving in the same direction simultaneously with uniform velocity of 10m/s
        and 5m/s respectively. Determine the time and position at which A overtakes B.   (2)

8.   Two trains 1200m and 800m in length are running in opposite direction with velocities
        42km/h and 30km/h. In what time they will completely cross each other.   (2)

9.   (i)   If the position of the object is given by $x = 3t^2 - 6t + 2$ where 'x' is position in meter
                 and 't' is time in seconds. Calculate the velocity and acceleration when t=2s.
        (ii)   The velocity of a particle changes by the relation v = (5t-3)m/s. Calculate the
                 position when t=3s. Gvien that x(0)= -5m   (3)

10.   A stone thrown upwards from the top of the tower 85m high, reaches the ground in 5s.
        Find (i) the greatest height above the ground (ii) the velocity with which it reaches
        the ground (iii) the time taken to reach the maximum height. Take $g = 10m/s^2$.   (3)

-x-x-x-x-x-