

Class 11  
8-8-2016

Second Unit Test (First Term) in PHYSICS

Time : 1 hr.  
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  $t=3s$ . Given 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-