Class 11 Physics · Chapter 2: Motion in a Straight Line

Worksheet · 20 marks · about 40 minutes · based on NCERT

Name _____ Class and section _____ Date _____

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1. The velocity of a cyclist on a straight road rises uniformly from 4 m s^{-1} to 12 m s^{-1} in 5 s. The displacement of the cyclist in these 5 s is [1]

(a) 60 m (b) 20 m
(c) 40 m (d) 80 m

2. A hockey ball moving at 6 m s^{-1} towards the east is struck and moves at 4 m s^{-1} towards the west 2 s later. Taking east as positive, the average acceleration of the ball in this interval is [1]

(a) 5 m s^{-2} (b) −1 m s^{-2}
(c) 1 m s^{-2} (d) −5 m s^{-2}

3. A jogger runs 300 m due east along a straight track and then turns and runs some distance due west along the same track. Over the whole run her average speed is twice the magnitude of her average velocity. How far did she run westward? [1]

(a) 100 m (b) 150 m
(c) 200 m (d) 50 m

4. A physics student treats a bus travelling 60 km between two towns as a point object. This is a fair approximation because [1]

(a) the bus moves with a uniform speed (b) the size of the bus is much smaller than the distance it moves
(c) the mass of the bus can be neglected (d) the road between the towns is straight

5. A portion of the position-time graph of a car is a curve that bends downward (its slope keeps decreasing). In that portion the acceleration of the car is [1]

(a) positive (b) negative
(c) zero (d) increasing with time

6. A stone is released near the earth's surface. State two conditions under which its fall can be treated as motion with uniform acceleration g. [2]

7. A car moving with uniform acceleration along a straight road covers 60 m in 4 s, at the end of which its speed is 20 m s^{-1}. Find its speed at the start of the 4 s and its acceleration. [2]

8. A particle starts from rest at the origin and moves along the x-axis with acceleration a = 6t (a in m s^{-2}, t in s). Find its velocity and position at t = 2 s. [2]

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9. Ball A is dropped from rest from the top of a 40 m high tower. At the same instant ball B is thrown vertically upward from the foot of the tower at 20 m s^{-1} along the same vertical line (g = 10 m s^{-2}, air resistance neglected). Find (a) when the balls meet, (b) the height at which they meet, (c) the velocity of B at that instant. [3]

10. A body moves along a straight line with uniform acceleration a, its velocity changing from v_0 at t = 0 to v at time t. Using its velocity-time graph, derive (a) $x = v_0t + \frac{1}{2}at^2$ and (b) $v^2 = v_0^2 + 2ax$, where x is its displacement in time t. [3]

11. A trolley released from rest rolls down a uniform inclined track with constant acceleration and covers 4 cm in the first second. Find (a) its acceleration, (b) the distance it covers in the fourth second, (c) the second during which it covers 44 cm. [3]