INDIAN SCHOOL DARSAIT
DEPARTMENT OF PHYSICS

Subject : Physics	Chapter : Motion in a Straight Line	Worksheet No. 3
Resource Person : Mrs. Jayalakshmi Ratish		Date : 24.05.18
Name of the Student :_____	Class & Division : XI A/B	Roll Number : __

1. A particle starts from the origin, goes along the x-axis to the point (20m, 0) and then returns along the same line to the point (–20m, 0). Find the distance and displacement of the particle during the trip. — 1

2. A spy report about a suspected car reads as follows. "The car moved 2.00 km towards east, made a perpendicular left turn, ran for 500m, made a perpendicular right turn, ran for 4.00 km and stopped". Find the displacement of the car. — 1

3. A carrom board (4ft × 4ft square) has the queen at the centre. The queen, hit by the striker moves to the front edge, rebounds and goes in the hole being the striking line. The magnitude of displacement of the queen from the centre to the front edge and also find the displacement from Front edge to the Hole? — 1

4. A mosquito net over a 7 ft × 4 ft bed is 3 ft high. The net has a hole at one corner of the bed through which a mosquito enters the net. It flies and sits at the diagonally opposite upper corner of the net. Find the magnitude of the displacement of the mosquito. — 1

5. A body covers an arc of a circle of radius 'r', subtending an angle of 120° at the centre of the circle. Find the magnitude of the displacement of the body. — 1

6. A runner runs 100 m in 10 s, then turns around and jogs 50m back toward the starting point in 30 s. Find the average speed of the runner. — 2

7. An athlete completes one round of a circular track of radius, R in 40 s. What will be the maximum displacement at the end of 2 min 20 sec.? — 2

8. Two cars A&B are running at velocities of 60km/h and 45 km/h respectively. Calculate the relative velocity of car A if:
   (i)they are both travelling eastwards
   (ii)Car A is travelling in eastwards & B is travelling westwards. — 2

9. During a hard sneeze, your eyes might shut for 0.5s. If you are driving a car at 90km/h during such a sneeze, how far does the car move during that time? — 2

10. If the meter stick falls 0.2 m before you catch it, what is your reaction time? — 2

11. Suppose a swimmer completes the first 50 m of the 100-m freestyle in 38.2 s. Once she reaches the far side of the 50-m-long pool, she turns around and swims back to the start in 42.5 s. What are the swimmer's average velocity and average speed for
    a) the leg from the start to the far side of the pool,
    b) the return leg, and — 3

c) the total lap?

12 From the top of a tower 100 m in height a ball is dropped and at the same time another ball is projected vertically upwards from the ground with a velocity of 25 m/s. Find when and where the two balls will meet.   3

13 A thief is running on a motorcycle at a constant speed of 25m/s. A police jeep starts chasing from a point 1.25 km behind him with a uniform acceleration of $2m/s^2$.   3
    a) After how much time will the police catch the thief?
    b) How much distance will the jeep cover to reach the thief?
    c) What should be the minimum acceleration of the thief to escape from police?

14 .The displacement (x) of a particle moving in one dimension, under the action of a constant force related to time t by the relation t $=\sqrt{x}$ +3 where x is in meters, and t is in seconds. Find the displacement of the particle when its velocity is zero.   3

15 A boy standing in a stationary lift (open from above) throws a ball upwards with the maximum initial speed he can, equal to 49 m/s. How much time does the ball take to return to his hands? If the lift starts moving up with a uniform speed of 5 m/s, and the boy again throws the ball with the maximum speed he can, how long does the ball take to return to his hands?   3

16 A woman starts from her home at 9.00 am, walks with a speed of 5 km/h on a straight road up to her office 2.5 km away, stays at the office up to 5.00 pm, and returns home by an auto with a speed of 25 km/h. Choose suitable scales and plot the x-t graph of her motion.

17 The speed-time graph of a particle moving along a fixed direction is shown in Fig. Obtain the distance traversed by the particle between
    (a) t = 0 s to 10 s,
    (b) t = 2 s to 6 s.
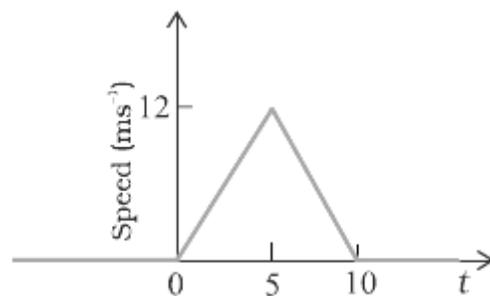
18 A man walks on a straight road from his home to a market 2.5 km away with a speed of 5 km/h. Finding the market closed, he instantly turns and walks back home with a speed of 7.5 km/h. What is the
    (a) magnitude of average velocity, and
    (b) average speed of the man over the interval of time(i) 0 to 30 min, (ii) 0 to 50 min, (iii) 0 to 40 min ?

19 A ball thrown vertically upwards with a speed of 19.6 m/s from the top of a tower returns to the earth in 6s. Find the height of the tower.

20 A body covers half of its journey a speed of 40 m/s and other half with a speed of 60 m/s. What is the average speed during the whole journey?