

LONG ANSWER TYPE QUESTIONS(MOTION)

1) A ball is gently dropped from a height of 20m. if its velocity increases uniformly at the rate of 10 m/s^2 , with what velocity will it strike the ground? After what time will it strike the ground?

2) A driver of train travelling at a speed of 15 m/s applies brakes and retards the train uniformly. The train stops in 5 seconds. Another train B is travelling on a parallel track with a speed of 10 m/s . its' driver applies the brakes and the train stops in 10 seconds retarding uniformly.

(a) Plot speed-time graphs for train A and Train B on the same paper.

(b) Calculate graphically which of the trains travelled farther after the brakes were applied.

3) A ball is thrown vertically upward with a velocity of 49 m/s . calculate:

(a) The maximum height to which it rises.

(b) The total time it takes to return to the surface of the earth. (Take $g=9.8 \text{ m/s}^2$)

4) A car is moving on a straight road with a uniform acceleration. The following table gives the speed of the car at various instant of time.

Time(s)	0	10	20	30	40	50
Speed (m/s)	5	10	15	20	25	30

(i) Draw the shape of speed-time graph representing the above sets of observations.

(ii) Find the acceleration of the car.

5) (i) What is uniform acceleration?

(ii) Derive the relation $S=ut+\frac{1}{2}at^2$ graphically.

6) (a) A car accelerates uniformly from 18 km/h to 36 km/h in 5s. Calculate:

(i) acceleration

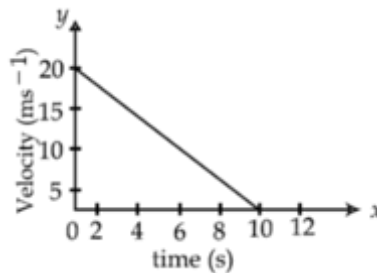
(ii) distance covered by the car in that time.

(b) The length of minute hand of a clock is 14cm. Calculate the speed with which the tip of the minute hand moves.

7) The driver of a train A travelling at a speed of 54km/h applies brakes and retards the train uniformly. The train stops in 5s. Another train B is travelling on the parallel track with a speed of 36km/h. This driver also applies the brakes and the train retards uniformly. The train B stops in 10s. Plot speed-time graph for both the trains on the same paper. Also calculate the distance travelled by each train after the brakes were applied.

8) A bus accelerates uniformly from 54km/h to 72km/h in 10s. Calculate: (i) the acceleration (ii) the distance covered by the bus in that time.

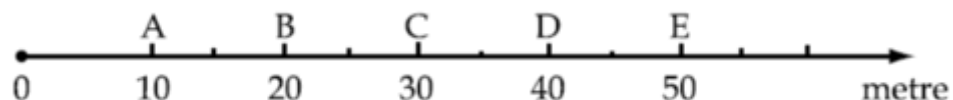
9) The velocity time graph of a ball of mass 20g moving along a straight line on a level ground is given below. How much force does the ground exert on the ball to bring it to rest?



10) Define uniformly accelerated motion. Also show that the area under a velocity-time graph gives the magnitude of displacement.

11) Brakes are applied to a moving truck to produce retardation of 5 m/s^2 . If the time taken between application of the brakes and the truck to stop is 2 seconds, calculate the distance travelled by the truck during this time.

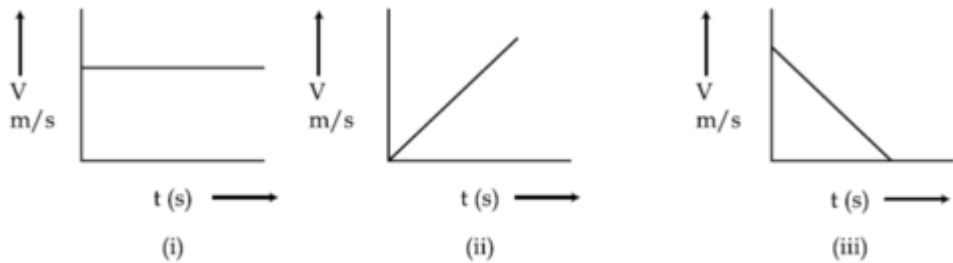
12) Look at the figure below.



An object starts its journey from point O. A, B, C, D and E represent position of the object at different instants. The objects moves through A, B, C, D and E and then moves back to point C. Calculate:

- (a) The distance travelled by the object
- (b) The displacement of the object
- (c) Name the reference point in the diagram

- 13) Derive the equation $v^2 - u^2 = 2as$ graphically.
- 14) A bus travels a of distance 120 km with a speed of 40km/h and returns with a speed of 30km/h. calculate the average speed for the entire journey.
- 15) A train accelerates uniformly from 36km/hr to 54km/hr in 10 seconds. Find (a) the acceleration (b) the distance travelled by the car during this interval of time.
- 16) What can you conclude about the motion of a body depicted by the velocity- time graphs (i), (ii) and (iii) given below :



- 17) A ball thrown up vertically returns to the thrower after 6s. Find
- (a) The velocity with which it was thrown up.
 - (b) The maximum height it reaches.
 - (c) Its position after 4s. (Take $g = 10 \text{ m/s}^2$)