Chapter 8

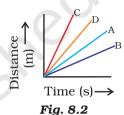
MOTION

Multiple Choice Questions

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1.	A particle is moving in a circular path of radius r . The displacement after half a circle would be:			
	(a) Zero			
	(b) π <i>r</i>			
	(c) 2 r			
	(d) $2\pi r$			
2.	A body is thrown vertically upward with velocity u , the greatest height h to which it will rise is,			
	(a) u/g (b) u^2/g	2g (c)	u^2/g	(d) $u/2g$
3.	The numerical ratio of displacement to distance for a moving obj			
	(a) always less than 1			
	(b) always equal to 1			
	(c) always more than 1			
	(d) equal or less than	L .		
4.	If the displacement of an object is proportional to square of time, then th object moves with			
	(a) uniform velocity			
	(b) uniform acceleration			
	(c) increasing acceleration			
	(d) decreasing acceleration			
=	From the given we together	omb (Fig. 9.1) it s		oformed that the chiest is
5 .	From the given $v - t$ graph (Fig. 8.1), it can be inferred that the object is			
	(a) in uniform motion			
	(b) at rest		1	
	(c) in non-uniform mo		v	
	(d) moving with unifor	m acceleration		
				$t \longrightarrow$

Fig. 8.1

- **6.** Suppose a boy is enjoying a ride on a *merry-go-round* which is moving with a constant speed of 10 m s⁻¹. It implies that the boy is
 - (a) at rest
 - (b) moving with no acceleration
 - (c) in accelerated motion
 - (d) moving with uniform velocity
- **7**. Area under av t graph represents a physical quantity which has the unit
 - (a) m²
 - (b) m
 - (c) m^3
 - (d) m s⁻¹
- 8. Four cars A, B, C and D are moving on a levelled road. Their distance versus time graphs are shown in Fig. 8.2. Choose the correct statement
 - (a) Car A is faster than car D.
 - (b) Car B is the slowest.
 - (c) Car D is faster than car C.
 - (d) Car C is the slowest.



9. Which of the following figures (Fig. 8.3) represents uniform motion of a moving object correctly?

(b)

Time (s) –

(d)

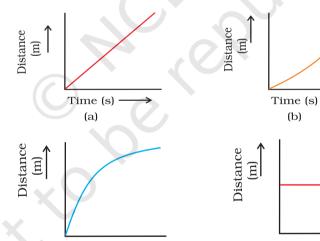


Fig. 8.3

Slope of a velocity – time graph gives

Time (s)

(c)

- (a) the distance
- (b) the displacement
- (c) the acceleration
- (d) the speed

- **11.** In which of the following cases of motions, the distance moved and the magnitude of displacement are equal?
 - (a) If the car is moving on straight road
 - (b) If the car is moving in circular path
 - (c) The pendulum is moving to and fro
 - (d) The earth is revolving around the Sun

Short Answer Questions

- **12**. The displacement of a moving object in a given interval of time is zero. Would the distance travelled by the object also be zero? Justify you answer.
- **13.** How will the equations of motion for an object moving with a uniform velocity change?
- 14. A girl walks along a straight path to drop a letter in the letterbox and comes back to her initial position. Her displacement–time graph is shown in Fig. 8.4. Plot a velocity–time graph for the same.

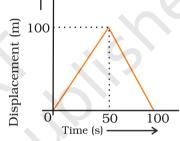


Fig. 8.4

- **15.** A car starts from rest and moves along *the x*-axis with constant acceleration 5 m s⁻² for 8 seconds. If it then continues with constant velocity, what distance will the car cover in 12 seconds since it started from the rest?
- **16.** A motorcyclist drives from A to B with a uniform speed of 30 km h^{-1} and returns back with a speed of 20 km h^{-1} . Find its average speed.
- 17. The velocity-time graph (Fig. 8.5) shows the motion of a cyclist. Find (i) its acceleration (ii) its velocity and (iii) the distance covered by the cyclist in 15 seconds.

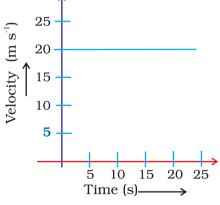
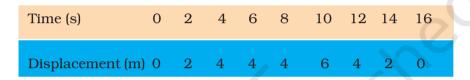


Fig. 8.5

18. Draw a velocity versus time graph of a stone thrown vertically upwards and then coming downwards after attaining the maximum height.

Long Answer Questions

- **19**. An object is dropped from rest at a height of 150 m and simultaneously another object is dropped from rest at a height 100 m. What is the difference in their heights after 2 s if both the objects drop with same accelerations? How does the difference in heights vary with time?
- **20**. An object starting from rest travels 20 m in first 2 s and 160 m in next 4 s. What will be the velocity after 7 s from the start.
- **21.** Using following data, draw time displacement graph for a moving object:



Use this graph to find average velocity for first 4 s, for next 4 s and for last 6 s.

- **22.** An electron moving with a velocity of 5×10^4 m s⁻¹ enters into a uniform electric field and acquires a uniform acceleration of 10^4 m s⁻² in the direction of its initial motion.
 - (i) Calculate the time in which the electron would acquire a velocity double of its initial velocity.
 - (ii) How much distance the electron would cover in this time?
- **23**. Obtain a relation for the distance travelled by an object moving with a uniform acceleration in the interval between 4th and 5th seconds.
- **24.** Two stones are thrown vertically upwards simultaneously with their initial velocities u_1 and u_2 respectively. Prove that the heights reached by them would be in the ratio of u_1^2 : u_2^2 (Assume upward acceleration is -g and downward acceleration to be +g).

60 Exemplar Problems