CHAPTER PRACTICE

MULTIPLE CHOICE QUESTIONS

1. The ratio of the displacement and distance for a moving object is
   (a) Always less than 1
   (b) Always greater than 1
   (c) Always equal to 1
   (d) Equal to or less than 1

2. Speedometer is a device which is used to measure the
   (a) Average speed
   (b) Average acceleration
   (c) Instantaneous speed
   (d) Instantaneous acceleration

3. If velocity of an object decreases with time, then it is called
   (a) Retardation (b) Deceleration
   (c) Negative acceleration (d) All of the above

4. A train starting from rest attains a velocity of 90 km/h in 2 min, then the distance travelled by the train attaining this velocity is
   (a) 1 km (b) 1.5 km
   (c) 2.5 km (d) 1.2 km

1 MARK QUESTIONS

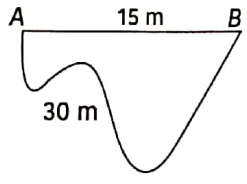
1. What is the importance of a reference point?
2. Is it possible that the train in which you are sitting appears to move while it is at rest?
3. Odometer measures displacement of the vehicle. Correct this statement.
4. Under what condition, will the magnitude of the displacement be equal to the distance travelled by an object?
5. A body goes round the sun with constant speed in a circular orbit. Is the motion uniform or accelerated?
6. What is the ratio of the average velocity to the average speed of an object when it is moving along a straight path?
7. Is the motion of a racing car on a circular track an example of uniform circular motion? Justify your answer.

2 MARK QUESTIONS

1. An object is moving with a uniform speed in a circle of radius *r*. Calculate the distance and displacement when it completes full circle.
2. When two bodies move uniformly towards each other, then they cross each other at the speed of 10 m/s. If both the bodies move in the same direction, then they cross each other at the speed of 6 m/s. Find the speed of both the bodies.
3. If a body is moving in a circular path of radius 21 cm with velocity of 2 m/s, then find the time taken by the body to complete half a revolution.
4. Imagine you are driving from city *A* to city *B*. How would you classify whether your motion throughout was uniform or non-uniform?
5. What examples can you find in your everyday life that can distinguish between distance and displacement?
6. How would you prove or disprove whether an object is executing uniform circular motion? Explain with an example.

3 MARK QUESTIONS

1. Answer the following
   (i) What is motion?
   (ii) State the types of motion.
   (iii) Write the unit of acceleration.
2. A cow and a bird both travelled from point A to point B the cow travelled in a straight line but the bird travelled along the curved path as shown below:



   (i) What is the distance travelled by the cow?
   (ii) What is the distance travelled by the bird?
   (iii) Which one of them has more displacement?

3. Express average velocity when the velocity of a body changes at a non-uniform rate.

4. Given one example each of the type of motion when
   (i) Acceleration is in the direction of motion
   (ii) Acceleration is against the direction of motion
   (iii) Acceleration is uniform

5. How will the equations of motion for an object moving with a uniform velocity change?

6. A car moves with a speed of 30 km/h for half an hour, 25 km/h for one hour and 40 km/h for two hours. Calculate average speed of the car.

7. Brakes applied to a car produce an acceleration of 6 m/s^2 in opposite direction to motion. If the car takes 2 s to stop after application of brakes, then calculate the distance it travels during this time.

8. A train accelerates uniformly from 36 km/h to 72 km/h in 20 s. Find the distance travelled.

9. The speedometer readings of a car are shown below. Find the acceleration of the car and its displacement.

Time	Speedometer
9:25 am	36 km/hr
9:45 am	72 km/hr

10. A car starts from rest and moves along the x-axis with a constant acceleration of 5 m/s^2 for 8 s. If it then continues with a constant velocity, then what distance will the car cover in 12 s, since it started from rest?

11. An object starting from rest travels 20 m in the first 2 s and 160 m in the next 4 s. What will be the velocity 7 s from the start?

12. How would you modify the statements below?
   (i) The distance covered by a body is always greater than its displacement.
   (ii) A vector quantity is described by its magnitude and also sometimes by its direction.
   (iii) Average velocity and average speed are always the same.

13. Classify the following as uniform or non-uniform acceleration.
   (i) An object falling from a height
   (ii) Motion of a train entering or leaving a station
   (iii) Motion of a person walking in a crowded street
   (iv) A ball rolling down a slope
   (v) Child coming down a slide
   (vi) Motion of a car in traffic

5 MARK QUESTIONS

1. Given one example of each of the following situations:
   (i) Uniformly accelerated motion
   (ii) Motion with uniform retardation
   (iii) Accelerated motion with uniform magnitude of velocity
   (iv) Motion in a direction with acceleration in perpendicular direction

2. On a 100 km track, a train travels the first 30 km at uniform speed of 30 km/h. How fast must the train travel the next 70 km, so as to average 40 km/h for the entire trip?

3. An insect moves along a circular path of radius 10 cm with a constant speed. It takes 1 min to move from a point on the path to the diametrically opposite point. Find:
   (i) The distance covered
   (ii) The speed
   (iii) The displacement
   (iv) The average velocity.

4. Find the errors in the following statements and correct them.
   (i) A body having a constant velocity can have varying speed.
   (ii) An object having constant speed has no acceleration.
   (iii) The SI unit for speed and velocity are different.
   (iv) If a particle's velocity is zero at $t = 0$, then its acceleration must also be zero.
   (v) During uniform circular motion, the velocity is parallel to the direction of motion.

HOTS QUESTIONS

2. Car A is travelling on a straight level road with a uniform speed of 60 km/h. It is followed by another car B which is moving with a speed of 70 km/h. When the distance between them is 2.5 km, the car B is given a deceleration of 20 km/h^2. After how much time will B catch up with A?

3. A bus begins to move with an acceleration of 1 m/s^2. A man who is 48 m behind the bus starts running at 10 m/s to catch the bus. After how much time will the man be able to catch the bus?

5. Particles P and Q are undergoing uniform horizontal circular motions along concentric circles of different radii in a clockwise direction. P completes each round in 2 min while Q does it in 5 min. What is the time required by Q to make one revolution around P?

6. A sprinter has to cover a total run of 100 m. She increases her speed from rest under a uniform acceleration of 1.0 m/s2 up to three quarters of the total run and covers the last quarter with uniform speed. Calculate the time she takes to cover the first half, and to cover the second half of the run.

CASE BASED QUESTIONS

Read the following and answer any four questions from I(1-5)

Case - I : An acceleration is produced in a body whenever the velocity of a body changes. This not only means an increase or decrease in velocity but also a change in direction of the velocity produces an acceleration. This is because acceleration is defined as:

$$\text{Acceleration} = \frac{\text{Change in velocity}}{\text{Change in time}}$$

And velocity is a vector quantity, therefore, a change in the direction of velocity will produce an acceleration.

This is very widely observed in everyday life. A fruit falling from a tree accelerates, a car making a turn around a corner accelerates, a satellite orbiting the Earth accelerates. In all of these cases there is a change in velocity which produces the acceleration.

1. In which of the following cases will an acceleration not be produced?
   (a) The moon orbiting the Earth
   (b) A pendulum swinging
   (c) A car moving at a constant velocity in a straight line
   (d) A car moving at a constant velocity in a circular path

2. A car uniformly accelerates from 23 m/s to 31 m/s in 40 s. Find the acceleration of the car.
   (a) 0.5 m/s² (b) 0.2 m/s²
   (c) 2 m/s² (d) 5 m/s²

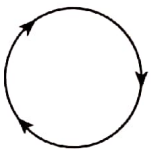
3. A satellite orbits the Earth because of:
   (a) Centripetal acceleration
   (b) Centrifugal acceleration
   (c) Zero acceleration
   (d) Non uniform acceleration

4. For a body falling from a height, its acceleration:
   (a) Uniformly decreases
   (b) Uniformly increases
   (c) Non-uniformly decreases
   d) Remains constant

5. Which of the following can produce an acceleration?
   (a) Increase in velocity
   (b) Change in the direction of velocity
   (c) Decrease in velocity
   (d) All of the above

Read the following and answer any four questions from II(6 - 10)

Case - II : The motion of an object along a circular path with a velocity of constant magnitude is known as uniform circular motion.



In the case of uniform circular motion even though the magnitude of the velocity is not changing, its direction at every point along the circle changes. This means that the acceleration is not constant.

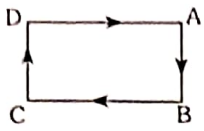
The direction of the velocity at every point along the circle is perpendicular to the direction of motion of the body at that point. The magnitude of the velocity can be found as $v = 2\pi r/t$

Here, r is the radius of the circular path and t is the time taken to complete one revolution.

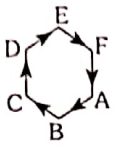
6. Which of the following quantities is constant in uniform circular motion?
   (a) Velocity
   (b) Speed
   (c) Acceleration
   (d) All of the above

7. What is the magnitude of the velocity for a body in a circular path of radius 1.5 m and period 10 s?
   (a) 0.30 m/s
   (b) 0.94 m/s
   (c) 9.42 m/s
   (d) 0.15 m/s

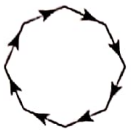
8. The motion of a body along 4 different closed tracks is shown below. The magnitude of its velocity is constant for all 4 tracks.

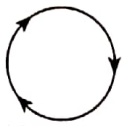


(a) Rectangular track



(b) Hexagonal track


(c) Octagonal shaped track


(d) A circular track

Let the number of times the body has to change direction be denoted by N_{shape}. Arrange N in increasing order for the 4 tracks.

(a) $N_{Rectangle} < N_{Octagonal} < N_{Hexagonal} < N_{circle}$
(b) $N_{circle} < N_{Octagonal} < N_{Hexagonal} < N_{Rectangle}$
(c) $N_{circle} < N_{Hexagonal} < N_{Octagonal} < N_{Rectangle}$
(d) $N_{Rectangle} < N_{Hexagonal} < N_{Octagonal} < N_{circle}$

9. Find the time taken by an object to cover a circular path of length 2.3 m with a velocity of constant magnitude 2 m/s.

(a) 1.15 s (b) 7.22 s
(c) 0.87 s (d) 0.14 s

10. A stone is tied to a rope and executing uniform circular motion. When the stone is released:

(a) It drops straight to the ground
(b) It moves along a straight line
(c) It flies straight up
(d) It moves in a curved path

Read the following and answer any four questions from III (11 - 15)

Case - III: One day Rahul decided to go his office by his car. He is enjoying the driving along with listening the old songs. His car is moving along a straight road at a steady speed. On a particular moment, he notices that the car travels 150 m in 5 seconds.

11. What is its average speed ?

(a) 20 m/s (b) 30 m/s
(c) 10 m/s (d) 40 m/s

12. How far does it travel in 1 second ?

(a) 20 m (b) 30 m
(c) 10 m (d) 40 m

13. How far does it travel in 6 seconds ?

(a) 120 m (b) 130 m
(c) 180 m (d) 140 m

14. How long does it take to travel 240 m ?

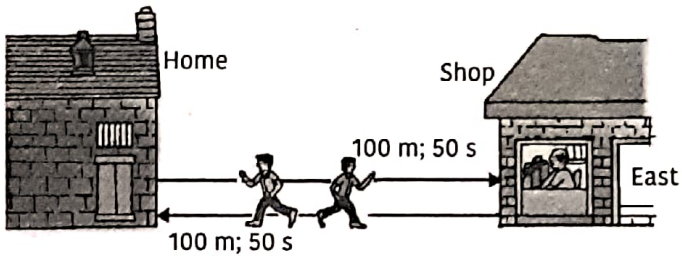
(a) 2s (b) 4s
(c) 6s (d) 8s

15. Which of the following statement is correct regarding velocity and speed of a moving body ?

(a) Velocity of a moving body is always higher than its speed
(b) Speed of a moving body is always higher than its velocity
(c) Speed of a moving body is its velocity in a given direction
(d) Velocity of a moving body is its speed in a given direction

Read the following and answer any four questions from IV (16 - 20)

Case - IV: Suppose the boy first runs a distance of 100 metres in 50 seconds in going from his home to the shop in the East direction, and then runs a distance of 100 metres again in 50 seconds in the reverse direction from the shop to reach back home from where he started (see Figure below).



16. Find the speed of the boy.

(a) 1 m/s (b) 2 m/s
(c) 3 m/s (d) none of these

17. Find the Velocity of the boy.

(a) 1 m/s (b) 2 m/s
(c) 3 m/s (d) 0 m/s

18. A boy is sitting on a merry-go-round which is moving with a constant speed of 10m/s. This means that the boy is:

(a) At rest
(b) Moving with no acceleration
(c) In accelerated motion
(d) Moving with uniform velocity

19. In which of the following cases of motion, 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 on circular road
(c) If the pendulum is moving to and fro
(d) If a planet is moving around the sun

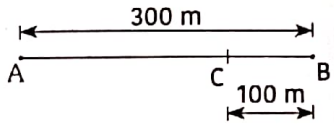
20. A particle is moving in a circular path of radius r. The displacement after half a circle would be :

(a) 0 (b) πr
(c) $2r$ (d) $2\pi r$

EXAM PRACTICE

NCERT QUESTIONS

1. An object has moved through a distance. Can it have zero displacement? If yes, support your answer with an example.
2. A farmer moves along the boundary of a square field of side 10 m in 40 s. What will be the magnitude of displacement of the farmer at the end of 2 min 20 from his initial position?
3. Which of the following is true for displacement?
   (i) It cannot be zero.
   (ii) Its magnitude is greater than the distance travelled by the object.
4. Distinguish between speed and velocity.
5. Under what condition (s) is the magnitude of average velocity of an object equal to its average speed?
6. What does the odometer of an automobile measure?
7. What does the path of an object look like when it is in a uniform motion?
8. During an experiment, a signal from a spaceship reached the ground station in five minutes. What was the distance of the spaceship from the ground station? The signal travels at the speed of light, i.e., 3×10^8 m/s.
9. When will you say a body is in
   (i) uniform acceleration?
   (ii) non-uniform acceleration?
10. A bus decreases its speed from 80 km/h to 60 km/h in 5 s. Find the acceleration of the bus.
11. A train stating from a railway station and moving with uniform acceleration attains a speed of 40 km/h in 10 min. find its acceleration.
12. A bus starting from rest moves with a uniform acceleration of 0.1 m/s^2 for 2 min. Find (i) the speed acquired, (ii) the distance travelled.
13. A train is travelling at a speed of 90 km/h. Brakes are applied, so as to produce a uniform acceleration of $-0.5 m/s^2$. Find how far the train will go before it is brought to rest?
14. A trolley while going down an inclined plane has an acceleration of 2 cm/s^2. What will be its velocity 3 s after the start?
15. A racing car has a uniform acceleration of 4 m/s^2 what distance will it cover in 10 s after the start?
16. A stone is thrown in a vertically upward direction with a velocity of 5 m/s. if the acceleration of the stone during its motion is 10 m/s^2 in the downward direction, then what will be the height attained by the stone and what time will it take to reach there?
17. An athlete completes one round of a circular track of diameter 200 m in 40 s. What will be the distance covered and the displacement at the end of 2 min 20 s?
18. Joseph jogs from one end A to the other end B of a straight 300 m road in 2 min 30 s and then turns around and jogs 100 m back to point C in another 1 min. what are Joseph's average speeds and velocities in jogging
   (i) from A to B and
   (ii) from A to C?



19. Abdul, while driving to school, computes the average speed for his trip to be 20 km/h. On his return trip along the same route. There is less traffic and the average speed is 30 km/h. What is the average speed for Abdul's trip?
20. A motorboat starting from rest on a lake accelerates in a straight line at a constant rate of 3 m/s^2 for 8 s. How far does the boat travel during this time?
21. A ball is gently dropped from a height of 20 m. if its velocity increases uniformly at the rate of 10 m/s^2, then with what velocity will it strike the ground? After what time it strike the ground?
22. State which of the following situations are possible and give an example for each.
   (i) An object with a constant acceleration but with zero velocity.
   (ii) An object moving in a certain direction with an acceleration in the perpendicular direction.
23. An artificial satellite is moving in a circular orbit of radius 42250 km. Calculate its speed, if it takes 24 h to revolve around the earth.

COMPETENCY QUESTIONS
(FOR FOUNDATION, NTSE, OLYMPIAD QUESTIONS)

SECTION A MULTIPLE CHOICE QUESTIONS

1. If a body is moving at constant speed in a circular path, its
   (a) velocity is constant and its acceleration is zero
   (b) velocity and acceleration are both changing direction only
   (c) velocity and acceleration are both increasing
   (d) velocity is constant and acceleration is changing direction

2. If a car is traveling north on a straight road and its brakes are applied, it will
   (a) have no acceleration
   (b) accelerate to the south
   (c) accelerate to the north
   (d) accelerate either east or west

3. An object moves with a uniform velocity when
   (a) the forces acting on the object are balanced
   (b) there is no external force on it
   (c) Both of (a) and (b)
   (d) Either (a) or (b)

4. The acceleration of a car that speeds up from 12 meters per second to 30 meters per second in 15 seconds is
   (a) 2.4 m/s^2 (b) 1.2 m/s^2
   (c) 2 m/s^2 (d) 5.2 m/s^2

5. A body moving along a straight line at 20 m/s undergoes an acceleration of – 4 m/s^2. After two seconds its speed will be
   (a) 8 m/s (b) 12 m/s
   (c) 16 m/s (d) 28 m/s

6. A particle experiences constant acceleration for 20 seconds after starting from rest. If it travels a distance S_1 in the first 10 seconds and distance S_2 in the next 10 seconds, then
   (a) $S_2 = S_1$ (b) $S_2 = 2S_1$
   (c) $S_2 = 3S_1$ (d) $S_2 = 4S_1$

7. In which of the following cases, the object does not possess an acceleration or retardation when it moves in
   (a) upward direction with decreasing speed
   (b) downward direction with increasing speed
   (c) with constant speed along circular path
   (d) with constant speed along horizontal direction

8. The speed of a falling body increases continuously, this is because
   (a) no force acts on it
   (b) it is very light
   (c) the air exert the frictional force
   (d) the earth attract it

9. If an object is in a state of equilibrium
   (a) it is at rest
   (b) it is in motion at constant velocity
   (c) it is in free fall
   (d) may be more than one of the above

10. A hockey player pushes the ball on the ground. It comes to rest after travelling certain distance because
   (a) the player stops pushing the ball
   (b) no unbalanced force action on the wall
   (c) the ball moves only when pushes
   (d) the opposing force acts on the body.

11. The physical quantity which is the product of mass and velocity of a body is known as
   (a) inertia (b) momentum
   (c) force (d) change in momentum

12. The direction of motion of a body is decided by _____ of the body
   (i) velocity (ii) acceleration
   (iii) displacement (iv) speed
   (a) (i) and (ii) only (b) (ii) and (iii) only
   (c) (i) and (iii) only (d) (i), (ii) and (iii)

13. A body having zero speed
   (i) is always under rest (ii) has zero acceleration
   (iii) has uniform acceleration (iv) always under motion
   (a) (i) and (ii) only (b) (ii) and (iii) only
   (c) (i) and (iii) only (d) (i), (ii) and (iii) only

14. The ratio of distances travelled by a uniformly accelerated body in first, second and third second is
   (i) 1 : 3 : 5
   (ii) an integral multiple of odd number ratio less than 7
   (iii) an integral multiple of odd natural numbers.
   (iv) 1 : 4 : 9
   (a) (i) and (ii) only (b) (ii) and (iii) only
   (c) (i) and (iii) only (d) (i), (ii) and (iii) only

15. The velocity of an object can be changed by
   (i) changing the speed
   (ii) changing the direction of motion
   (iii) changing both the speed and direction of motion
   (iv) None of the above
   (a) (i) and (ii) only (b) (ii) and (iii) only
   (c) (i) and (iii) only (d) (i), (ii) and (iii)

16. Motion of an object is the change in position with respect to a reference point known as
   (a) origin (b) initial position
   (c) final position (d) distance

17. Displacement is the

(a) shortest distance between initial and final positions
(b) the actual distance between initial and final positions
(c) the distance traveled by the object
(d) distance traveled by the object in a unit time

18. An object has traveled 10 km in 15 minutes, its displacement will be

(a) 10 km (b) Can be zero
(c) More than 10 km (d) All of the above

19. If an object covers equal distances in equal intervals of time, it is said to be in

(a) Circular Motion (b) Uniform Motion
(c) Oscillatory Motion (d) Non-uniform Motion

20. Average velocity of an object is obtained by

(a) Dividing the total distance traveled by the total time taken
(b) Half of the sum of the initial velocity and the final velocity
(c) Both (i) and (ii)
(d) None of the above

21. Magnitude of average speed of an object is equal to its average velocity if

(a) It is moving in a definite direction
(b) Its initial and final positions are same
(c) It is a uniform motion
(d) None of these

22. Negative value of acceleration signifies

(a) The velocity is increasing
(b) The velocity is decreasing
(c) The velocity remains the same
(d) The object comes to rest

23. The equation(s) of motion can be represented as

(a) $v = v + at$ (b) $s = ut + \frac{1}{2}at^2$
(c) $2as = v^2 - v^2$ (d) All of these

24. A jeep starts from rest and attains a speed of 40 kmh^{-1} in 10 minutes. The uniform acceleration will be

(a) 4 kmh^{-2} (b) 4 kms^{-2}
(c) 66.7 ms^{-2} (c) 1.85 cms^{-2}

25. A train travels 40 km at a uniform speed of 30kmh^{-1}. Its average speed after traveling another 40km is 45kmh^{-1} for the whole journey. Its speed in the second half of the journey is

(a) 45 kmh^{-1}
(b) 90 kmh^{-1}
(c) 60 kmh^{-1}
(d) None of these

26. A man walks on a straight road from his home to market 2.5 km away with a speed of 5 kmh^{-1}. Finding the market closed, he instantly turns and walks back home with a speed of 7.5 kmh^{-1}. The average speed of the man over the interval of time 0 to 40 min. is equal to –

(a) 5 kmh^{-1} (b) $\frac{25}{4}$ kmh^{-1}
(c) $\frac{30}{4}$ kmh^{-1} (d) $\frac{45}{8}$ kmh^{-1}

27. The position of a particle moving along the X-axis at certain times is given below :

$t(s)$	0	1	2	3
$v(m)$	–2	0	6	16

Which of the following describes the motion correctly?

(a) Uniform, accelerated
(b) Uniform, decelerated
(c) Non-uniform, accelerated
(d) There is not enough data for generalization

28. You are on an ocean liner that is going eastward at 12.0 ms^{-1}, and you run southward at 3.6 ms^{-1}. The magnitude and direction of your resulting velocity.

(a) 15.6 ms^{-1}, E/W (b) 18.4 ms^{-1}, W/E
(c) 12.5 ms^{-1}, S/E (d) 13.5 ms^{-1}, S/E

29. If a car can accelerate at 3.2 ms^{-2}, how long will it take to speed up from 15 ms^{-1} to 22 ms^{-1}-

(a) 2.2 s (b) 1.2 s
(c) 5 s (c) 4 s

30. A ball is dropped from a window 24 meters high. How long will it take to reach the ground ?

(a) 2.2 s (b) 1.2 s
(b) 4.5 s (c) 0.2 s

31. A pitcher throws his fastball horizontally at 42.1 ms^{-1}. How far does it drop before crossing the plate, 18.3 meters away?

(a) 0.8 m (b) 1.2 m
(c) 2.2 m (d) 0.93 m

32. Mohan takes 20 minutes to cover a distance of 3.2 kilometers due north on a bicycle, his velocity in kilometer/hour-

(a) 8.1 (b) 9.6
(c) 1.2 (d) 7.2

33. Which of the following statements contains a reference to displacement?

I. "The town is a five mile drive along the winding country road."
II. "The town sits at an altitude of 940 m."
III. "The town is ten miles north, as the crow flies."

(a) I only (b) III only
(b) I and III only (d) II and III only

34. A small block slides without friction down an inclined plane starting from rest. Let S_n be the distance travelled from time $t = n - 1$ to $t = n$. Then $n \frac{S_n}{S_{n+1}}$ is

(a) $\frac{2n-1}{2n}$

(b) $\frac{2n+1}{2n-1}$

(b) $\frac{2n-1}{2n+1}$

(d) $\frac{2n}{2n+1}$

35. Two balls A and B of same masses are thrown from the top of the building. A, thrown upward with velocity V and B, thrown downward with velocity V, then

(a) Velocity of A is more than B at the ground

(b) Velocity of B is more than A at the ground

(c) Both A and B strike the ground with same velocity

(d) None of these

36. A ball is released from the top of a tower of height h meters. It takes T seconds to reach the ground. What is the position of the ball in T/ 3 seconds –

(a) h/ 9 meters from the ground

(b) 7h/ 9 meters from the ground

(c) 8h/ 9 meters from the ground

(d) 17h/ 18 meters from the ground

37. A thief snatches a purse and runs due west, going 6.0 meters per second. A policeman, 15 meters to the east, sees the event and gives chase. If the officer is a good sprinter, going at 8.5 meters per second, how far does he have to run to catch the thief –

(a) 12 m

(b) 51 m

(c) 61 m

(d) 55 m

38. A car going at 24 meters per second passes a motorcycle at rest. As it passes, the motorcycle starts up, accelerating at 3.2 meters per second squared. If the motorcycle can keep up that acceleration, how long will it take for it to catch the car –

(a) 12 s

(b) 14 s

(c) 20 s

(d) 18 s

39. The initial velocity of a body is 15 m/s. If it is having an acceleration of 10 m/s^2, then the velocity of body after 10 seconds from start –

(a) 110 m/s (b) 105 m/s

(c) 120 m/s (d) 115 m/s

SECTION B MATCHING BASED MCQ

DIRECTIONS (Qs.48 to 52): Match Column-I with Column-II and select the correct answer using the codes given below the columns.

40.

	Column-I		Column-II
(A)	Distance travelled by a uniformly accelerated body after time t.	(p)	$s = ut$
(B)	Distance travelled by a body moving with a constant velocity	(q)	$s_n = u + \frac{a}{2}(2n-1)$
(C)	Distance covered by a uniformly accelerated body in the nth second of its motion	(r)	$s = ut + \frac{1}{2}at$
(D)	Speed	(s)	Displacement / Time taken
(E)	Velocity	(t)	Distance travelled / Time taken

(a) A) - (r); (B) - (q); (C) - (p); (D) - (t); (E) - (s)
(b) (A) - (r); (B) - (p) ; (C) - (q); (D) - (s); (E) - (t)
(c) (A) - (p); (B) - (r) ; (C) - (q); (D) - (t); (E) - (s)
(d) (A) - (r); (B) - (p) ; (C) - (q); (D) - (t); (E) - (s)

41.

	Column-I	Column-II
(A)	0.02 km	(p) 2000 mm
(B)	9.8 ms^{-2}	(q) 980 cms^{-2}
(C)	15 cms^{-1}	(r) 3.6 kmh^{-1}
(D)	1 ms^{-1}	(s) 10 ms^{-1}
(E)	36 kmh^{-1}	(t) 0.54 kmh^{-1}

(a) A - (p); B - (q); C - (t); D - (r); E - (s)
(b) A - (r); B - (s); C - (t); D - (p); E - (q)
(c) A - (q); B - (r); C - (p); D - (t); E - (s)
(d) A - (t); B - (p); C - (r); D - (s); E - (q)

SECTION C STATEMENT BASED MCQ

42. Consider the following statements:

(i) Magnitude of displacement can be equal to or lesser than distance.

(ii) In a journey, numerical value of displacement ≤ distance.

Which of these statement(s) is/are correct ?

(a) (i) only (ii) (b) only

(c) Both (i) and (ii) (c) Neither (i) nor (ii)

43. Consider the following statements:

(i) The movement of the earth about its axis is an example of uniform speed.

(ii) Unit of speed in S.I. system is cms^{-1}.

(iii) If a body is moving on a curved path with constant speed, then its acceleration is perpendicular to the direction of motion.

Which of these statement(s) is/are correct?

(a) (i) and (ii) (b) (i) and (iii)

(b) (ii) and (iii) (c) All are correct

44. Consider the following statements:

(i) If particle speed is constant, acceleration of the particle must be zero.

(ii) A particle is known to be at rest at time $t = 0$. Its acceleration at $t = 0$ must be zero.

Which of these statement(s) is/are correct?

(a) (i) only (b) (ii) only

(b) Both (i) and (ii) (d) Neither (i) nor (ii)

45. Consider the following statements:

(i) A body can have constant velocity and still have varying speed.

(ii) A body falls freely from a height with uniform acceleration.

Which of these statement(s) is/are correct?

(a) (i) only (b) (ii) only

(b) Both (i) and (ii) (d) Neither (i) nor (ii)

SECTION D PASSAGE BASED MCQ

DIRECTIONS (Qs. 57 to 60): Read the passage(s) given below and answer the questions that follow.

Passage-1: A person throws a ball vertically upward with an initial velocity of 15 m/s.

46. How high it goes?

(a) 11.5 m (b) 12.5 m

(c) 8 m (d) 6 m

47. How long the ball is in air before it comes to his hand ?

(a) 2.0 s (b) 1.0 s

(c) 3.06 s (d) 5.01 s

Passage-2 : A car is travelling with a speed of 36 km/hr. The driver applies the brakes & retard the car uniformly. The car is stopped in 5 seconds.

48. The retardation of the car is –

(a) $2\ m/s^2$ (b) $3\ m/s^2$

(c) $4\ m/s^2$ (d) $6\ m/s^2$

49. The distance travelled before it is stopped after applying the brakes is –

(a) 20 m (b) 25 m

(c) 30 m (d) 35 m

SECTION E ASSERTION REASON BASED MCQ

DIRECTIONS (Qs. 61 to 63): Following questions consist of two statements, one labelled as the 'Assertion' and the other as 'Reason'. You are to examine these two statements carefully and select the answer to these items using the code given below.

Codes:

(a) Both A and R are individually true and R is the correct explanation of A:

(b) Both A and R are individually true but R is not the correct explanation of A.

(c) A is true but R is false

(d) A is false but R is true.

50. **Assertion:** The displacement of a stone thrown up or down from a tower will be the same as they reach the ground.

Reason: Distance travelled by the stone thrown up is more than the distance travelled by the stone thrown down.

51. **Assertion:** The distance 'x' in which a car can be stopped depends on the initial velocity.

Reason: Change in mass has no role to play.

52. **Assertion:** The motion of a body moving in a circular path with constant speed is an example of variable acceleration.

Reason: Acceleration varies due to change in direction.

SECTION F DEFINITION BASED MCQ

53. Uniform circular motion is a

(a) motion in which speed vary but direction of velocity is constant

(b) motion in which speed remains constant but direction of velocity changes

(c) motion in which speed remains constant along with direction of velocity

(d) motion in which speed and direction of velocity both changes

54. Average velocity is

(a) $\frac{\text{Total displacement}}{\text{Total time taken}}$

(b) Total displacement × Total time taken

(c) $\frac{\text{Total time taken}}{\text{Total displacement}}$

(d) $\frac{\text{Total distance}}{\text{Total time taken}}$

55. The formula of acceleration is

(a) $\frac{v \times u}{t}$ (b) $\frac{v + u}{t}$

(c) $\frac{u - v}{t}$ (d) $\frac{v - u}{t}$