

Class: IX
Subject: Physics
Topic: Motion In One Dimension
No. of Questions: 20
Duration: 60 Min
Maximum Marks: 60

Q1. If a car at rest accelerates uniformly to a speed of 144 km/h in 20 sec, it covers a distance of

- a. 20 cm
- b. 400m
- c. 1440m
- d. 2980cm

Ans: b

Hint: 1. Convert into given units

$$2. s = v_{avg}t = (v+u)/2 \cdot T$$

Q2. The displacement – time graphs of two particles A and B are straight lines making angles of respectively 30° and 60° with the time axis. If the velocity of A is v_A and that of B is v_B , the value of v_A/v_B is

- a. 1/2
- b. $1/\sqrt{3}$
- c. $\sqrt{3}$
- d. 1/3

Ans: d

Hint: Calculate angle of tangent and relate the angles

Q3. A person travels along a straight road for the first half time with a velocity v_1 and the second half time with a velocity v_2 Then the mean velocity v_{avg} is given by

- a. $v_{avg} = \frac{v_1 + v_2}{2}$
- b. $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$
- c. $v_{avg} = \sqrt{\frac{v_1 v_2}{v_1 + v_2}}$

d. $v_{avg} = \sqrt{\frac{v_2}{v_1}}$

Ans: a

Hint: Calculate average velocity which is due to net displacement in given time.

Q4. A passenger travels along the straight road for half the distance with velocity v_1 and the remaining half distance with velocity v_2 . Then average velocity is given by

- a. $v_1 v_2$
- b. v_2^2/v_1^2
- c. $(v_1+v_2)/2$
- d. $2v_1 v_2 / (v_1+v_2)$

Ans: d

Hint: Average velocity is due to net displacement in given time.

Q5. A bus starts moving with acceleration 2 m/s^2 . A cyclist 96 m behind the bus starts simultaneously towards the bus at 20 m/s . After what time will he be able to overtake the bus?

- a. 4 sec
- b. 8 sec
- c. 12 sec
- d. 16 sec

Ans: b

Hint: Use equation of motions and relate the time periods for these given condition.

Q6. The velocity of a particle at an instant is 10 m/s . After 5 sec, the velocity of the particle is 20 m/s . The velocity at 3 seconds before from the instant when velocity of a particle is 10 m/s .

- a. 8 m/s
- b. 4 m/s
- c. 6 m/s
- d. 7 m/s

Ans: b

Hint: $v = u + at$

Q7. A particle covers half of the circle of radius r . Then the displacement and distance of the particle are respectively

- a. $2\pi, 0$
- b. $2r, \pi r$
- c. $\frac{\pi r}{2}, 2r$
- d. $\pi r, r$

Ans: b

Hint: Displacement is shortest distance.

Q8. A ball released from a height falls 5 m in one second. In 4 Seconds it falls through

- a. 20 m
- b. 1.25 m
- c. 40 m
- d. 80 m

Ans: d

Hint: $h = u.t + \frac{1}{2}gt^2$

Q9. A food packet is released from a helicopter rising steadily at the speed of 2 m/sec. After 2 seconds the velocity of the packet is ($g=10 \text{ m/sec}^2$)

- a. 22 m/sec
- b. 20 m/sec
- c. 18 m/sec
- d. None of the above

Ans: c

Hint: $h = u.t + \frac{1}{2}gt^2$

Initial velocity gains by food packet w.r.t. helicopter would be same in magnitude but opposite in direction.

Q10. A rifle bullet loses $1/20^{\text{th}}$ of its velocity in passing through a plank. The least number of such planks required just to stop the bullet is

- a. 5
- b. 10
- c. 11
- d. 20

Ans: c

Hint: $v = u + at$

Q11. A ball is dropped downwards, after 1 sec another ball is dropped downwards from the same point. What is the distance between them after 3 sec?

- a. 25 m
- b. 20 m
- c. 50 m
- d. 9.8 m

Ans: a

Hint: Use equations of motion for these two balls.

Q12. If a ball is thrown vertically upwards with a velocity of 40m/s, then velocity of the ball after two seconds is : ($g=10 \text{ m/sec}^2$)

- a. 15 m/s
- b. 20 m/s
- c. 25 m/s
- d. 25 m/s

Ans: b

Hint: $v = u + at$

Q13. A stone is thrown vertically upwards. When the particle is at a height half of its maximum height, its speed is 10 m/s; then maximum height attained by particle is ($g=10 \text{ m/sec}^2$)

- a. 8 m
- b. 10 m
- c. 15 m
- d. 20 m

Ans: b

Hint: $v^2 = u^2 + 2 as$

Q14. An automobile travelling with a speed of 60 km/h, can brake to stop within a distance of 20m. If the car is going twice as fast i.e., 120 km/h, the stopping distance will be

- a. 60 m
- b. 40 m
- c. 20 m
- d. 80 m

Ans: d

Hint:: $v^2 = u^2 + 2 as$

Use proper sign for deceleration

Q15. The motion of a particle is described by the equation $u = at$. The distance travelled by particle in first 4 sec is

- a. 4a
- b. 12a
- c. 6a
- d. 8a

Ans: d

Hint: $S = u dt$ and integrate the given function.

Q16. A stone is just released from the window of a train moving along a horizontal straight track. The stone will hit the ground following a

- a. Straight line path
- b. Circular path
- c. Parabolic path
- d. Hyperbolic path

Ans: c

Hint: Locus of the resultant path would be due to square addition of path along horizontal and vertical axes.

Q17. A particle is moving eastwards with a velocity of 5 ms^{-1} . In 10 seconds the velocity changes to 5 ms^{-1} northwards. The average acceleration in this time is

- a. $\frac{1}{2} \text{ ms}^{-1}$ towards north – east
- b. $\frac{1}{\sqrt{2}} \text{ ms}^{-1}$ towards north – east
- c. $\frac{1}{\sqrt{2}} \text{ ms}^{-2}$ towards north – west
- d. zero

Ans: c

Hint: Average acceleration is change in velocity w.r.t. total time.

Also consider the direction.

Q18. A parachutist after bailing out falls 50 m without friction. When parachute opens, it decelerates at 2 m/s^2 . He reaches the ground with a speed of 3 m/s . At what height, did he bail out?

- a. 182 m
- b. 91 m
- c. 111 m
- d. 293 m

Ans: d

Hint: $v^2 = u^2 + 2 g h$ and use proper sign for 'g' according to the motion.

Q19. A car moving with a speed of 40 km/hour can be stopped by applying brakes after at least 2m . If the same car is moving with a speed of 80km/hour , what is the minimum stopping distance.

- a. 8m
- b. 6m
- c. 4m
- d. 2m

Ans: a

Hint: $v^2 = u^2 + 2 a s$

Q20. The acceleration due to gravity on planet A is nine times the acceleration due to gravity on planet B. A man jumps to a height 2 m on the surface of A. What is height of jump by same person on planet B?

- a. $2/3 \text{ m}$
- b. $2/9 \text{ m}$
- c. 18 m
- d. 6 m

Ans: c

Hint: Use $h = ut + \frac{1}{2} gt^2$

Compare the acceleration for the given planets and put in the given motion equation