JEE MAIN : CHAPTER WISE TEST PAPER-3

SUBJECT :- PHYSICS **DATE.....**
CLASS :- 11th **NAME.....**
CHAPTER :- KINEMATICS **SECTION.....**

(SECTION-A)

1. A particle at a height ' h ' from the ground is projected with an angle 30° from the horizontal, it strikes the ground making angle 45° with horizontal. It is again projected from the same point with the same speed but with an angle of 60° with horizontal. Find the angle it makes with the horizontal when it strikes the ground :

(A) $\tan^{-1}(4)$ (B) $\tan^{-1}(5)$

(C) $\tan^{-1}(\sqrt{5})$ (D) $\tan^{-1}(\sqrt{3})$

2. A body dropped from the top of a tower covers 7/16 of the total height in the last second of its fall. The time of fall is

(A) 2 sec (B) 4 sec

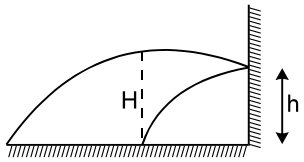
(C) 1 sec (D) $\left(\frac{50}{7}\right)$sec

3. A stone is dropped from a running bus. It will hit the ground in a-

(A) Straight path (B) Circular path

(C) Parabolic path (D) None of these

4. A stone is projected from a horizontal plane. It attains maximum height 'H' & strikes a stationary smooth wall & falls on the ground vertically below the maximum height. Assuming the collision to be elastic the height of the point on the wall where ball will strike is



(A) $\frac{H}{2}$ (B) $\frac{H}{4}$

(C) $\frac{3H}{4}$ (D) None of these

5. The displacement x of a particle varies with time t as $x = ae^{-\alpha t} + be^{\beta t}$, where a, b, α and β are positive constants. The velocity of the particle will :

(A) go on decreasing with time

(B) be indepenent of α and β

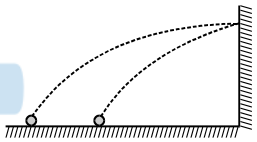
(C) drop to zero when $\alpha = \beta$

(D) go on increasing with time

6. A car A is going North-East at 80 km/hr. and another car B is going South-East at 60 km./hr. Then the direction of the velocity of A relative to B makes with the North and angle α such that $\tan\alpha$ is-

(A) $\frac{1}{7}$ (B) $\frac{3}{4}$ (C) $\frac{4}{3}$ (D) $\frac{3}{5}$

7. A stone is projected from ground and hits a smooth vertical wall after 1 sec. and again falls back on the ground. The time taken by stone to reach the ground after the collision is 3 secs. The maximum height reached by the same stone if the vertical wall were not to be present is. ($g = 10\ m/s^2$)



(A) 10 m (B) 12.5 m

(C) 15 m (D) 20 m

8. Two bodies, A (of mass 1kg) and B (of mass 3kg) are dropped from heights of 16 m and 25 m, respectively. The ratio of the time taken by them to reach the ground is :

(A) 5/4 (B) 12/5 (C) 5/12 (D) 4/5

9. A ship is travelling due east at 10 km/h. A ship heading 30° east of north is always due north from the first ship. The speed of the second ship in km/h is -

(A) $20\sqrt{2}$ (B) $20\sqrt{3/2}$

(C) 20 (D) $20/\sqrt{2}$

10. If R and h represent the horizontal range and maximum height respectively of an oblique projection whose start point (i.e. point of projecteion) & end point are in same horizontal level. Then $\frac{R^2}{8h} + 2h$ represents

(A) maximum horizontal range

(B) maximum vertical range

(C) time of flight

(D) velocity of projectile at highest point

11. When two particles each of mass m are dropped from height h and 2h respectively, then the ratio of their times to reach the ground is

(A) 1 : $\sqrt{2}$ (B) $\sqrt{2}$: 1

(C) 1 : 2 (D) 2 : 1

12. A boat takes two hours to travel 8 km and back in still water. If the velocity of water is 4 km/h, the time taken for going upstream 8 km and coming back is -

(A) 2h

(B) 2h 40 min

(C) 1h 20 min

(D) Cannot be estimated with the information given

13. At the uppermost point of a projectile, its velocity and acceleration are at an angle of

(A) 180° (B) 90° (C) 60° (D) 45°

14. A car moving with a speed of 50 km/h, can be stopped by brakes after at least 6m. If the same car is moving at a speed of 100 km/h, the minimum stopping distance is

(A) 12 m (B) 18 m (C) 24 m (D) 6 m

15. Two observers A and B are moving opposite to each other on a parallel track, separated by a distance d, with same speed. When they are at the shortest distance, a particle is thrown horizontally from some height from ground by A towards B with respect to itself. The path of the particle observed by B is –

(A) Horizontal straight line.

(B) Vertical straight line.

(C) Straight line at some angle with the horizontal.

(D) Parabolic.

16. The maximum range of a gun horizontal terrain is 10 km. If g = 10 m/s^2 what must be the muzzle velocity of the shell

(A) 400 m/s (B) 200 m/s

(C) 100 m/s (D) 50 m/s

17. A particle moving with a uniform acceleration travels 24 m and 64 m in the first two consecutive intervals of 4 sec each. Its initial velocity is

(A) 1 m/sec (B) 10 m/sec

(C) 5 m/sec (D) 2 m/sec

18. A particle is thrown up inside a stationary lift of sufficient height. The time of flight is T. Now it is thrown again with same initial speed v_0 with respect to lift. At the time of second throw, lift is moving up with speed v_0 and uniform acceleration g upward (the acceleration due to gravity). The new time of flight is–

(A) $\frac{T}{4}$ (B) $\frac{T}{2}$ (C) T (D) 2T

19. The displacement of a body is given to be proportional to the cube of time passed. The magnitude of the acceleration of the body, is

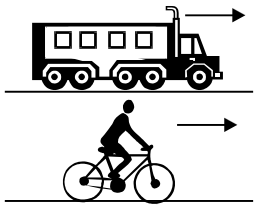
(A) Increasing with time

(B) Decreasing with time

(C) Constant but not zero

(D) Zero

20. A cyclist observes a passenger in a bus. He finds that the passenger closed his glass window displacing 20 cm in forward direction with constant speed in 1 sec. Bus overtakes the cyclist in 3 sec. Initially he was at the middle of the bus as shown in the figure. Length of the bus is 18 m. Both cyclist and bus are moving with constant speed in the same direction. Then velocity of the glass window with respect to cyclist was:



(A) 0.2 m/s (B) 2.8 m/s

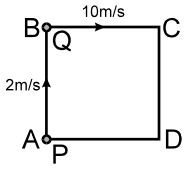
(C) 3.2 m/s (D) 3 m/s

(SECTION-B)

21. A missile is fired for maximum range with an initial velocity of 20 m/s. If g = 10 m/s^2, the range of the missile is :

22. A car moves for half of its time at 80 km/h and for rest half of time at 10 km/h. Total distance covered is 60 km. What is the average speed of the car

23. Two men P & Q are standing at corners A & B of square ABCD of side 8 m. They start moving along the track with constant speed 2 m/s and 10 m/s respectively. Find the time when they will meet for the first time.



24. The time of flight of a projectile is 10s and range is 500m. Maximum height attained by it is-[g = 10 m/s²]

25. A body dropped from a height h with initial velocity zero, strikes the ground with velocity 3 m/s. Another body of same mass is dropped from the height h with an initial velocity of 4 m/s. Find the final velocity with which it strikes the ground

26. A coin is released inside a lift at a height of 2 m from the floor of the lift. The height of the lift is 10 m. The lift is moving with an acceleration of 9 m/s^2 downwards. The time after which the coin will strike with the lift is : (g = 10 m/s^2)

27. The horizontal and verticle distances travelled by a particle in time t are given by x = 6t and y = 8t – 5t^2. If g = 10 m/sec^2, then the initial velocity of the particle is-

28. A car moving with a speed of 40 km/hr can be stopped by applying breaks after atleast 2m. If the same car is moving with a speed of 80 km/h. What is the minimum stopping distance

29. Rain is falling vertically with a velocity of 3 kmh^{-1}. A man walks in the rain with a velocity of 4 kmh^{-1}. The rain drops will fall on the man with a velocity of

30. A projectile is thrown with velocity v making an angle θ with the horizontal. It just crosses the top of two poles, each of height h, after 1 second and 3 second respectively. The time of flight of the projectile is