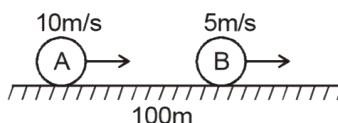
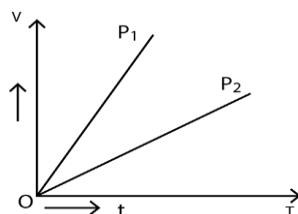


DPP - 1

1. An object A is moving with 10 m/s and B is moving with 5 m/s in the same direction of positive x-axis. A is 100 m behind B as shown. the time taken by A to meet B is $2^{k-2} + 4$. value of k is ____



2. A ship is steaming due east at 12 ms^{-1} . A woman runs across the deck at 5 ms^{-1} (relative to ship) in a direction towards north. the velocity of the woman relative to sea is $\frac{13}{2}n$. n is ____
3. A particle is kept at rest at origin. Another particle starts from (5 m, 0) with a velocity of $-4\hat{i} + 3\hat{j} \text{ m/s}$. their closest distance of approach $3^{\alpha+\beta} \text{ m}$. value of $\alpha + \beta$ is
4. Four particles situated at the corners of a square of side 'a', move at a constant speed v. Each particle maintains a direction towards the next particle in succession. the time the particles will take to meet each other is $\frac{a}{v} \frac{5}{p}$. then p is equal to ____
5. An is aeroplane flying vertically upwards with a uniform speed of 500 m/s. When it is at a height of 1000 m above the ground a shot is fired at it with a speed of 700 m/s from a point directly below it. The minimum uniform acceleration of the aeroplane now so that it may escape from being hit? ($g = 10 \text{ m/s}^2$)
 (A) 10 m/s^2 (B) 8 m/s^2 (C) 12 m/s^2 (D) None of these
6. A stone is thrown upwards from a tower with a velocity 50 ms^{-1} . Another stone is simultaneously thrown downwards from the same location with a velocity 50 ms^{-1} . When the first stone is at the highest point, the relative velocity of the second stone with respect to the first stone is (assume that second stone has not yet reached the ground):
 (A) Zero (B) 50 ms^{-1} (C) 100 ms^{-1} (D) 150 ms^{-1}
7. Shown in the figure are the velocity time graphs of the two particles P_1 and P_2 . Which of the following statements about their relative motion is true? Magnitude of their relative velocity: (consider 1-D motion)

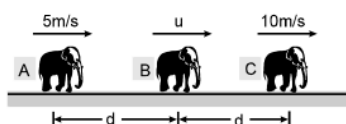


- (A) is zero (B) is non-zero but constant
 (C) continuously decreases (D) continuously increases

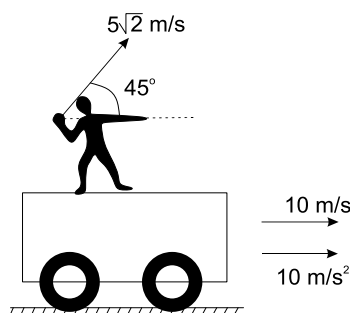
(Physics)

RELATIVE MOTION

8. Two trains A and B which are 100 km apart are travelling towards each other on different tracks with each having initial speed of 50 km/h. The train A accelerates at 20 km/h^2 and the train B retards at the rate 20 km/h^2 . The distance covered by the train A when they cross each other is:
 (A) 45 km (B) 55 km (C) 65 km (D) 60 km
9. Two particles are moving with velocities v_1 and v_2 . Their relative velocity is the maximum, when the angle between their velocities is:
 (A) zero (B) $\pi/4$ (C) $\pi/2$ (D) π
10. Raindrops are falling vertically with a velocity of 10 m/s. To a cyclist moving on a straight road the raindrops appear to be coming with a velocity of 20 m/s. The velocity of cyclist is:
 (A) 10 m/s (B) $10\sqrt{3} \text{ m/s}$ (C) 20 m/s (D) $20\sqrt{3} \text{ m/s}$
11. 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 11 m/s^2 downwards. The time after which the coin will strike with the lift is:
 (A) 4 s (B) 2 s (C) $\frac{4}{\sqrt{21}} \text{ s}$ (D) $\frac{2}{\sqrt{11}} \text{ s}$
12. Three elephants A, B and C are moving along a straight line with constant speed in same direction as shown in figure. Speed of A is 5 m/s and speed of C is 10 m/s. Initially separation between A & B is 'd' and between B & C is also d. When 'B' catches 'C' separation between A & C becomes 3 d. Find the speed of B (in m/s).



13. A man standing on a truck which moves with a constant horizontal acceleration $a (= 10 \text{ m/s}^2)$ when speed of the truck is 10 m/s. The man throws a ball with velocity $5\sqrt{2} \text{ m/s}$ with respect to truck. In the direction shown in the diagram. Find the displacement of ball in meters in one second as observed by the man. ($g = 10 \text{ m/s}^2$)



ANSWER KEY

- | | | | | | | | | | | | | | |
|----|-----|----|-----|-----|-----|-----|-----|-----|------|-----|-----|----|-----|
| 1. | (6) | 2. | (2) | 3. | (1) | 4. | 5 | 5. | (A) | 6. | (C) | 7. | (D) |
| 8. | (D) | 9. | (D) | 10. | (B) | 11. | (A) | 12. | (15) | 13. | (0) | | |

