

HORIZONTAL MOTION

1. A Body moves 6 m north. 8 m east and 10m vertically upwards, what is its resultant displacement from initial position [DCE 2000]
(1) $10\sqrt{2}m$ (2) 10m (3) $\frac{10}{\sqrt{2}}m$ (4) $10 \times 2m$
2. A man goes 10m towards North, then 20m towards east then displacement is [KCET 1999; JIPMER 1999; AFMC 2003]
(1) 22.5m (2) 25m (3) 25.5m (4) 30m
3. A person moves 30 m north and then 20 m towards east and finally $30\sqrt{2}$ m in south-west direction. The displacement of the person from the origin will be [J & K CET 2004]
(1) 10 m along north (2) 10 m long south
(3) 10 m along west (4) Zero
4. An aeroplane flies 400 m north and 300 m south and then flies 1200 m upwards then net displacement is [AFMC 2004]
(1) 1200 m (2) 1300 m (3) 1400 m (4) 1500 m
5. An athlete completes one round of a circular track of radius R in 40 sec. What will be his displacement at the end of 2 min. 20 sec [NCERT1990; Kerala PMT 2004]
(1) Zero (2) 2R (3) $2\pi R$ (4) $7\pi R$
6. A wheel of radius 1 meter rolls forward half a revolution on a horizontal ground. The magnitude of the displacement of the point of the wheel initially in contact with the ground is [BCECE 2005]
(1) 2π (2) $\sqrt{2}\pi$ (3) $\sqrt{\pi^2 + 4}$ (4) π
7. A person travels along a straight road for half the distance with velocity v_1 and the remaining half distance with velocity v_2 . The average velocity is given by [MP PMT 2001]
(1) v_1v_2 (2) $\frac{v_2^2}{v_1^2}$ (3) $\frac{v_1 + v_2}{2}$ (4) $\frac{2v_1v_2}{v_1 + v_2}$
8. The displacement-time graph for two particles A and B are straight lines inclined at angles of 30° and 60° with the time axis. The ratio of velocities of $v_A : v_B$ is [CPMT 1990; MP PET 1999; MP PET 2001; Pb. PET 2003]
(1) 1 : 2 (2) $1 : \sqrt{3}$ (3) $\sqrt{3} : 1$ (4) 1 : 3
9. A car travels from A to B at a speed of 20 km / hr and returns at a speed of 30 km / hr . The average speed of the car for the whole journey is [MP PET 1985]
(1) 25 km / hr (2) 24 km / hr (3) 50 km / hr (4) 5 km / hr

10. A boy walks to his school at a distance of 6 km with constant speed of 2.5 km/hour and walks back with a constant speed of 4 km/hr. His average speed for round trip expressed in km/hour, is [AIIMS 1995]
(1) 24/13 (2) 40/13 (3) 3 (4) 1/2
11. A car travels the first half of a distance between two places at a speed of 30 km/hr and the second half of the distance at 50 km/hr. The average speed of the car for the whole journey is [Manipal MEE 1995; AFMC 1998]
(1) 42.5 km/hr (2) 40.0 km/hr (3) 37.5 km/hr (4) 35.0 km/hr
12. One car moving on a straight road covers one third of the distance with 20 km/hr and the rest with 60 km/hr. The average speed is [MP PMT 1999; CPMT 2002]
(1) 40 km/hr (2) 80 km/hr (3) $46\frac{2}{3}$ km/hr (4) 36 km/hr
13. A car moves for half of its time at 80 km/h and for rest half of time at 40 km/h. Total distance covered is 60 km. What is the average speed of the car [RPET 1996]
(1) 60 km/h (2) 80 km/h (3) 120 km/h (4) 180 km/h
14. A train has a speed of 60 km/h. for the first one hour and 40 km/h for the next half hour. Its average speed in km/h is [JIPMER 1999]
(1) 50 (2) 53.33 (3) 48 (4) 70
15. Which of the following is a one dimensional motion [BHU 2000; CBSE PMT 2001]
(1) Landing of an aircraft (2) Earth revolving a round the sun
(3) Motion of wheels of a moving trains (4) Train running on a straight track
16. A 150 m long train is moving with a uniform velocity of 45 km/h. The time taken by the train to cross a bridge of length 850 meters is [CBSE PMT 2001]
(1) 56 sec (2) 68 sec (3) 80 sec (4) 92 sec
17. A particle is constrained to move on a straight line path. It returns to the starting point after 10 sec. The total distance covered by the particle during this time is 30 m. Which of the following statements about the motion of the particle is false [CBSE PMT 2000; AFMC 2001]
(1) Displacement of the particle is zero (2) Average speed of the particle is 3 m/s
(3) Displacement of the particle is 30 m (4) Both (1) and (2)
18. A particle moves along a semicircle of radius 10m in 5 seconds. The average velocity of the particle is [Kerala (Engg.) 2001]
(1) $2\pi\text{ ms}^{-1}$ (2) $4\pi\text{ ms}^{-1}$ (3) 2 ms^{-1} (4) 4 ms^{-1}
19. A man walks on a straight road from his home to a market 2.5 km away with a speed of 5 km/h. Finding the market closed, he instantly turns and walks back home with a speed of 7.5 km/h. The average speed of the man over the interval of time 0 to 40 min. is equal to [AMU (Med.) 2002]
(1) 5 km/h (2) $\frac{25}{4}$ km/h (3) $\frac{30}{4}$ km/h (4) $\frac{45}{8}$ km/h

- 20.** The ratio of the numerical values of the average velocity and average speed of a body is always
[MP PET 2002]
- (1) Unity (2) Unity or less (3) Unity or more (4) Less than unity
- 21.** A person travels along a straight road for the first half time with a velocity v_1 and the next half time with a velocity v_2 . The mean velocity v of the man is
[RPET 1999; BHU 2002]
- (1) $\frac{2}{V} = \frac{1}{v_1} + \frac{1}{v_2}$ (2) $v = \frac{v_1 + v_2}{2}$ (3) $v = \sqrt{v_1 v_2}$ (4) $v = \sqrt{\frac{v_1}{v_2}}$
- 22.** The numerical ratio of displacement to the distance covered is always
[BHU 2004]
- (1) Less than one (2) Equal to one
(3) Equal to or less than one (4) Equal to or greater than one
- 23.** A 100 m long train is moving with a uniform velocity of 45 km/hr. The time taken by the train to cross a bridge of length 1 km is
[BHU 2004]
- (1) 58 s (2) 68 s (3) 78 s (4) 88 s
- 24.** A particle moves for 20 seconds with velocity 3 m/s and then velocity 4 m/s for another 20 seconds and finally moves with velocity 5 m/s for next 20 seconds. What is the average velocity of the particle
[MH CET 2004]
- (1) 3 m/s (2) 4 m/s (3) 5 m/s (4) Zero
- 25.** A particle experiences a constant acceleration for 20 sec after starting from rest. If it travels a distance s_1 in the first 10 sec and a distance s_2 in the next 10 sec, then
[NCERT 1972; CPMT 1997; MP PMT 2002]
- (1) $s_1 = s_2$ (2) $s_1 = s_2 / 3$ (3) $s_1 = s_2 / 2$ (4) $s_1 = s_2 / 4$
- 26.** The displacement x of a particle along a straight line at time t is given by $x = a_0 + a_1 t + a_2 t^2$. The acceleration of the particle is
[NCERT 1974; RPMT 1999; AFMC 1999]
- (1) a_0 (2) a_1 (3) $2a_2$ (4) a_2
- 27.** The coordinates of a moving particle at any time are given by $x = at^2$ and $y = bt^2$. The speed of the particle at any moment is
[DPMT 1984; CPMT 1997]
- (1) $2t(a + b)$ (2) $2t\sqrt{(a^2 - b^2)}$ (3) $t\sqrt{a^2 + b^2}$ (4) $2t\sqrt{(a^2 + b^2)}$
- 28.** An electron starting from rest has a velocity that increases linearly with the time that is $v = kt$, where $k = 2m / \text{sec}^2$. The distance travelled in the first 3 seconds will be
[NCERT 1982]
- (1) 9 m (2) 16 m (3) 27 m (4) 36 m
- 29.** The displacement of a body is given to be proportional to the cube of time elapsed. The magnitude of the acceleration of the body is
[NCERT 1990]
- (1) Increasing with time (2) Decreasing with time
(3) Constant but not zero (4) Zero

30. The displacement of a particle is given by $y = a + bt + ct^2 - dt^4$. The initial velocity and acceleration are respectively **[CPMT 1999, 2003]**
- (1) $b, -4d$ (2) $-b, 2c$ (3) $b, 2c$ (4) $2c, -4d$
31. A car moving with a speed of 40 km/h can be stopped by applying brakes after atleast 2 m . If the same car is moving with a speed of 80 km/h , what is the minimum stopping distance **[CBSE PMT 1998, 1999; AFMC 2000; JIPMER 2001, 02]**
- (1) 8 m (2) 2 m (3) 4 m (4) 6 m
32. If a train travelling at 72 kmph is to be brought to rest in a distance of 200 metres , then its retardation should be **[SCRA 1998; MP PMT 2004]**
- (1) 20 ms^{-2} (2) 10 ms^{-2} (3) 2 ms^{-2} (4) 1 ms^{-2}
33. A particle starts from rest, accelerates at 2 m/s^2 for 10s and then goes for constant speed for 30s and then decelerates at 4 m/s^2 till it stops. What is the distance travelled by it **[DCE 2001; AIIMS 2002; DCE 2003]**
- (1) 750 m (2) 800 m (3) 700 m (4) 850 m
34. The engine of a motorcycle can produce a maximum acceleration 5 m/s^2 . Its brakes can produce a maximum retardation 10 m/s^2 . What is the minimum time in which it can cover a distance of 1.5 km **[Pb. PMT 2002]**
- (1) 30 sec (2) 15 sec (3) 10 sec (4) 5 sec
35. The path of a particle moving under the influence of a force fixed in magnitude and direction is **[MP PET 2002]**
- (1) Straight line (2) Circle (3) Parabola (4) Ellipse
36. A body is moving with uniform acceleration describes 40 m in the first 5 sec and 65 m in next 5 sec . Its initial velocity will be **[Pb. PET 2003]**
- (1) 4 m/s (2) 2.5 m/s (3) 5.5 m/s (4) 11 m/s
37. The displacement x of a particle varies with time $t, x = ae^{-\alpha t} + be^{\beta t}$, where a, b, α and β are positive constants. The velocity of the particle will **[CBSE PMT 2005]**
- (1) Go on decreasing with time (2) Be independent of α and β
(3) Drop to zero when $\alpha = \beta$ (4) Go on increasing with time
38. A particle moves along x -axis as $x = 4(t-2) + a(t-2)^2$ Which of the following is true ? **[J&K CET 2005]**
- (1) The initial velocity of particle is 4 (2) The acceleration of particle is $2a$
(3) The particle is at origin at $t = 0$ (4) None of these
39. A body starting from rest moves with constant acceleration. The ratio of distance covered by the body during the 5th sec to that covered in 5 sec is **[Kerala PET 2005]**
- (1) $9/25$ (2) $3/5$ (3) $25/9$ (4) $1/25$
40. What determines the nature of the path followed by the particle **[AFMC 2005]**
- (1) Speed (2) Velocity (3) Acceleration (4) None of these

41. An object accelerates from rest to a velocity 27.5 m/s in 10 sec then find distance covered by object in next 10 sec [BCECE 2004]
 (1) 550 m (2) 137.5 m (3) 412.5 m (4) 275 m
42. If the velocity of a particle is given by $v = (180 - 16x)^{1/2} \text{ m/s}$, then its acceleration will be [J & K CET 2004]
 (1) Zero (2) 8 m/s^2 (3) -8 m/s^2 (4) 4 m/s^2
43. The displacement of a particle is proportional to the cube of time elapsed. How does the acceleration of the particle depends on time obtained [Pb. PET 2001]
 (1) $a \propto t^2$ (2) $a \propto 2t$ (3) $a \propto t^3$ (4) $a \propto t$
44. Starting from rest, acceleration of a particle is $a = 2(t-1)$. The velocity of the particle at $t = 5 \text{ s}$ is [RPET 2002]
 (1) 15 m/sec (2) 25 m/sec (3) 5 m/sec (4) None of these
45. A body A moves with a uniform acceleration a and zero initial velocity. Another body B , starts from the same point moves in the same direction with a constant velocity v . The two bodies meet after a time t . The value of t is [MP PET 2003]
 (1) $\frac{2v}{a}$ (2) $\frac{v}{a}$ (3) $\frac{v}{2a}$ (4) $\sqrt{\frac{v}{2a}}$

KEY

1) 1	2) 1	3) 3	4) 1	5) 2	6) 3	7) 4	8) 4	9) 2	10) 2
11) 3	12) 4	13) 1	14) 2	15) 4	16) 3	17) 3	18) 4	19) 2	20) 2
21) 2	22) 3	23) 4	24) 2	25) 2	26) 3	27) 4	28) 4	29) 1	30) 3
31) 1	32) 4	33) 1	34) 1	35) 1	36) 3	37) 4	38) 2	39) 1	40) 4
41) 3	42) 3	43) 4	44) 1	45) 1					