Horizontal Motion

1. **A body moves 6 *m* North, 8 *m* East and 10*m* 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 10*m* towards North, then 20*m* towards East then displacement is [KCET 1999; JIPMER 1999; AFMC 2003]**

(1) 22.5*m* (2) 25*m* (3) 25.5*m* (4) 30*m*

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) $v_1 v_2$ (2) $\frac{v_2^2}{v_1^2}$ (3) $\frac{v_1 + v_2}{2}$ (4) $\frac{2v_1 v_2}{v_1 + v_2}$

8. **The displacement-time graph for two particles *A* and *B* are straight lines inclined at angles of 30^o and 60^o 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 10*m* in 5 seconds. The average velocity of the particle is [Kerala (Engg.) 2001]

(1) $2\pi\ ms^{-1}$ (2) $4\pi\ ms^{-1}$ (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 [MHCET 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 $k = 2m/\sec^2$. 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 10*s* and then goes for constant speed for 30*s* 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 2*a*

(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 $v = (180 - 16x)^{1/2}$ *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 $t = 5s$ 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**					