Yakeen NEET 2.0 2026

Motion in a Straight Line

Assignment-04
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Physics by M.R Sir

1. The position x of a particle varies with time, (t) as $x = at^2 - bt^3$. The acceleration will be zero at time t is equal to: **[1997]**

(1) $\frac{a}{3b}$ (2) Zero

(3) $\frac{2a}{3b}$ (4) $\frac{a}{b}$

2. The acceleration of a particle is increasing linearly with time t as bt. The particle starts from origin with an initial velocity v_0. The distance travelled by the particle in time t will be: **[1995]**

(1) $v_0t + \frac{1}{3}bt^2$ (2) $v_0t + \frac{1}{2}bt^2$

(3) $v_0t + \frac{1}{6}bt^3$ (4) $v_0t + \frac{1}{3}bt^3$

3. The velocity of train increases uniformly from 20 km/h to 60 km/h in 4 hours. The distance travelled by the train during this period, is **[1994]**

(1) 160 km (2) 180 km

(3) 100 km (4) 120 km

4. A car accelerates from rest at a constant rate α for some time after which it decelerates at a constant rate β and comes to rest. If total time elapsed is t, then maximum velocity acquired by car will be: **[1994]**

(1) $\frac{(\alpha^2 - \beta^2)t}{\alpha\beta}$ (2) $\frac{(\alpha^2 + \beta^2)t}{\alpha\beta}$

(3) $\frac{(\alpha + \beta)t}{\alpha\beta}$ (4) $\frac{\alpha\beta t}{\alpha + \beta}$

5. A particle moves along a straight line such that its displacement at any time t is given by $s = (t^3 - 6t^2 + 3t + 4)$ metres. The velocity when the acceleration is zero is: **[1994]**

(1) 3 m/s (2) 42 m/s

(3) –9 m/s (4) –15 m/s

6. A body starts from rest, what is the ratio of the distance travelled by the body during the 4th and 3rd second? **[1993]**

(1) 7/5 (2) 5/7

(3) 7/3 (4) 3/7

7. A car is moving along a straight road with a uniform acceleration. It passes through two points P and Q separated by a distance with velocity 30 km/h and 40 km/h respectively. The velocity of the car midway between P and Q is: **[MR* 1988]**

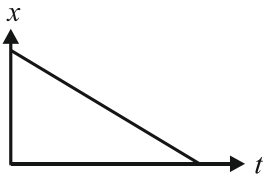
(1) 33.3 km/h

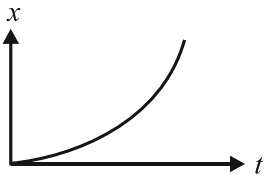
(2) $20\sqrt{2}$ km/h

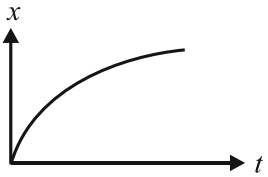
(3) $25\sqrt{2}$ km/h

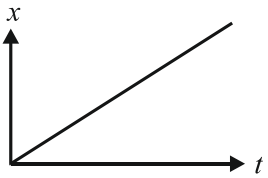
(4) 35 km/h

8. The position-time (x-t) graph for positive acceleration is: **[2022 Re]**

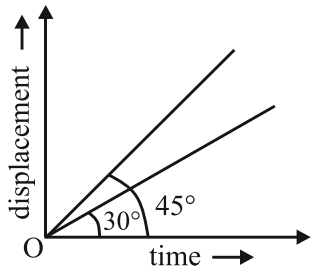
(1) 

(2) 

(3) 

(4) 

9. The displacement time graphs of two moving particle make angles of 30° and 45° with the *x*-axis as shown in the figure. The ratio of their respective velocity is: **[2022]**



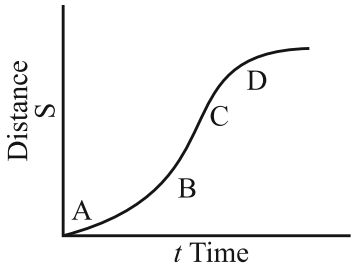
(1) $1 : \sqrt{3}$

(2) $\sqrt{3} : 1$

(3) 1 : 1

(4) 1 : 2

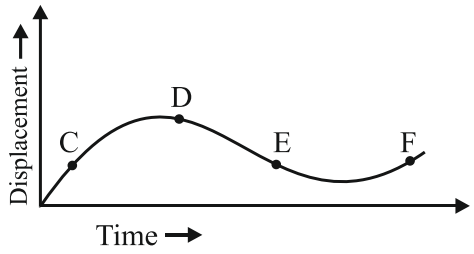
10. A particle shows distance-time curve as given in this figure. The maximum instantaneous velocity of the particle is around the point **[2008]**



(1) D (2) A

(3) B (4) C

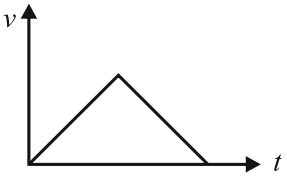
11. The displacement-time graph of a moving particle is shown below. The instantaneous of the particle is negative at the point: **[MR* 1994]**

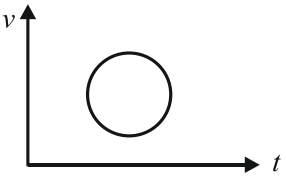


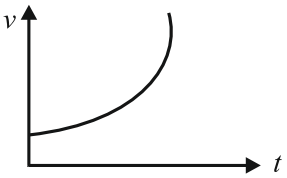
(1) E (2) F

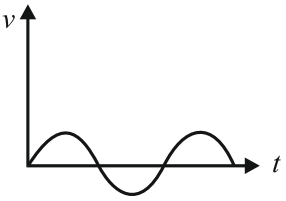
(3) C (4) D

12. Which of the following curve does not represent motion in one dimension? **[MR* 1992]**

(1)


(2)


(3)


(4)


13. 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 **[2005]**

(1) be independent of β

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

(3) go on decreasing with time

(4) go on increasing with time

14. For a particle displacement time relation is $t = \sqrt{x} + 3$. Its displacement when its velocity is zero: **[1999]**

(1) 2 m (2) 4 m

(3) 0 (4) None of these

15. A bus travelling the first one-third distance at a speed of 10 km/h, the next one-third at 20 km/h and at last one-third at 60 km/h. The average speed of the bus is: **[MR* 1997]**

(1) 9 km/h (2) 16 km/h

(3) 18 km/h (4) 48 km/h

16. A car moves a distance of 200 m. It covers the first half of the distance at speed 40 km/h and the second half of distance at speed v. The average speed is 48 km/h. The value of v is: **[1991]**

(1) 56 km/h (2) 60 km/h

(3) 50 km/h (4) 48 km/h

17. A car covers the first half of the distance between two places at 40 km/h and another half at 60 km/h. The average speed of the car is: **[1990]**

(1) 40 km/h (2) 48 km/h

(3) 50 km/h (4) 60 km/h

18. A particle of unit mass undergoes one dimensional motion such that its velocity varies according to $v(x) = \beta x^{-2n}$ where β and n are constants and x is the position of the particle. The acceleration of the particle as a function of x, is given by: **[2015]**

(1) $-2n\,\beta^2 x^{-4n-1}$ (2) $-2n\,\beta^2 x^{+2n+1}$

(3) $-2n\,\beta^2 x^{-4n+1}$ (4) $-2n\,\beta^2 x^{-2n-1}$

19. The motion of a particle along a straight line is described by equation: $x = 8 + 12t - t^3$ where x is in metre and t in second. The retardation of the particle when its velocity becomes zero, is **[2012 Pre]**

(1) 24 ms^{-2} (2) Zero

(3) 6 ms^{-2} (4) 12 ms^{-2}

20. A particle moves a distance x in time t according to equation $x = (t + 5)^{-1}$. The acceleration of particle is proportional to **[2010 Pre]**

(1) $(\text{velocity})^{2/3}$ (2) $(\text{velocity})^{3/2}$

(3) $(\text{distance})^2$ (4) $(\text{distance})^{-2}$

21. A particle starts its motion from rest under the action of a constant force. If the distance covered in first 10 seconds is S_1 and that covered in the first 20 seconds is S_2, then: **[2009]**

(1) $S_2 = 3S_1$ (2) $S_2 = 4S_1$

(3) $S_2 = S_1$ (4) $S_2 = 2S_1$

22. The distance travelled by a particle starting from rest and moving with an acceleration $\frac{4}{3}\,ms^{-2}$, in the third second is **[2008]**

(1) $\frac{10}{3}$ m (2) $\frac{19}{3}$ m

(3) 6 m (4) 4 m

23. A particle moves in a straight line with a constant acceleration. It changes its velocity form 10 ms^{-1} to 20 ms^{-1} while passing through a distance 135 m in to second. The value of t is **[2008]**

(1) 12 (2) 9

(3) 10 (4) 1.8

24. The position x of a particle with respect to time t along x-axis is given by $x = 9t^2 - t^3$ where x in metres and t in second. What will be the position of this particle when it achieves maximum speed along the +ve x direction? **[2007]**

(1) 54 m (2) 81 m

(3) 24 m (4) 32 m

25. Motion of a particle is given by equation $S = (3t^3 + 7t^2 + 14t + 8)$m. The value of acceleration of the particle at $t = 1$ sec is: **[MR* 2000]**

(1) 10 m/s^2 (2) 32 m/s^2

(3) 23 m/s^2 (4) 16 m/s^2

26. A particle starts from rest with constant acceleration. The ratio of average velocity to the time average velocity is: **[1999]**

(1) 1/2 (2) 3/4

(3) 4/3 (4) 3/2

27. If a car at rest accelerates uniformly to a speed of 144 km/h in 20 sec, it covers a distance of **[1997]**

(1) 1440 cm (2) 2980 cm

(3) 20 m (4) 400 m

28. A vehicle travels half the distance with speed v and the remaining distance with speed $2v$. Its average speed is: **[2023]**

(1) $\frac{3v}{4}$ (2) $\frac{v}{3}$

(3) $\frac{2v}{3}$ (4) $\frac{4v}{3}$

29. Two cars P and Q start from a point at the same time in a straight line and their positions are represented by $X_P(t) = at + bt^2$ and $X_Q(t) = ft - t^2$. At what time do the cars have the same velocity? **[2016-II]**

(1) $\frac{a+f}{2(1+b)}$ (2) $\frac{f-a}{2(1+b)}$

(3) $\frac{a-f}{1+b}$ (4) $\frac{a+f}{2(b-1)}$

30. If the velocity of a particle is $v = At + Bt^2$, where A and B are constants, then the distance travelled by it between 1s and 2s is: **[2016-I]**

(1) $\frac{3}{2}A + 4B$

(2) $3A + 7B$

(3) $\frac{3}{2}A + \frac{7}{3}B$

(4) $\frac{A}{2} + \frac{B}{3}$

31. A particles covers half of its total distance with speed v_1 and the rest half distance with speed v_2. Its average speed during the complete journey is:

[2011 Mains]

(1) $\frac{v_1 v_2}{v_1 + v_2}$ (2) $\frac{2v_1 v_2}{v_1 + v_2}$

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

32. A car runs at a constant speed on a circular track of radius 100 m, taking 62.8 s for every circular lap. The average velocity and average speed for each circular lap respectively is: **[2006]**

(1) 0, 0 (2) 0, 10 m/s

(3) 10 m/s, 20 m/s (4) 20 m/s, 0

33. A particle moves along a straight line OX. At a time t (in seconds) the distance x (in meters) of the particle from O is given by $x = 40 + 12t - t^3$. How long would the particle travel before coming to rest?

[MR* 2006]

(1) 14 m (2) 16 m

(3) 56 m (4) 40 m

ANSWER KEY

1.	(1)	12.	(2)	23.	(2)
2.	(3)	13.	(4)	24.	(1)
3.	(2)	14.	(3)	25.	(2)
4.	(1)	15.	(3)	26.	(3)
5.	(3)	16.	(2)	27.	(4)
6.	(1)	17.	(2)	28.	(4)
7.	(3)	18.	(1)	29.	(2)
8.	(2)	19.	(4)	30.	(3)
9.	(1)	20.	(2)	31.	(2)
10.	(4)	21.	(2)	32.	(2)
11.	(1)	22.	(1)	33.	(2)

PW Web/App - https://smart.link/7wwosivoicgd4

Library- https://smart.link/sdfez8ejd80if