

NEET MOTION IN A STRAIGHT LINE — NON-UNIFORM ACCELERATION (CALCULUS BASED) — PYQS

Max. Marks: 48

Questions: 12

Section A (MCQ) — 12 questions

Q.1 In some appropriate units, time (t) and position (x) relation of a moving particle is given by $t = x^2 + x$. The acceleration of the particle is [NEET (UG) 2025]

- (1) $+\frac{2}{(x+1)^3}$ (2) $+\frac{2}{2x+1}$
(3) $-\frac{2}{(x+2)^3}$ (4) $-\frac{2}{(2x+1)^3}$

Scan or tap for the full solution 

Q.2 A particle is moving along x -axis with its position (x) varying with time (t) as $x = \alpha t^4 + \beta t^2 + \gamma t + \delta$. The ratio of its initial velocity to its initial acceleration, respectively, is: [RE-NEET (UG) 2024]

- (1) $2\alpha:\delta$ (2) $\gamma:2\delta$ (3) $4\alpha:\beta$ (4) $\gamma:2\beta$

Scan or tap for the full solution 

Q.3 If the velocity of a particle is $v = At + Bt^2$, where A and B are constants, then the distance travelled by it between 1 s and 2 s is [NEET 2016 (Phase 1)]

- (1) $\frac{3}{2}A + \frac{7}{3}B$ (2) $\frac{A}{2} + \frac{B}{3}$
(3) $\frac{3}{2}A + 4B$ (4) $3A + 7B$

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Q.4 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

[AIPMT 2015 (Cancelled)]

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

Scan or tap for the full solution 

Q.5 The displacement ' x ' (in meter) of a particle of mass ' m ' (in kg) moving in one dimension under the action of a force, is related to time ' t ' (in sec) by $t = \sqrt{x} + 3$. The displacement of the particle when its velocity is zero, will be [NEET 2013 (Karnataka)]

- (1) 4 m (2) 0 m (zero)
(3) 6 m (4) 2 m

Scan or tap for the full solution 

Q.6 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

[AIPMT 2012 (Prelims)]

- (1) 24 m s^{-2} (2) zero (3) 6 m s^{-2} (4) 12 m s^{-2}

Scan or tap for the full solution 

Q.7 A particle moves a distance x in time t according to equation $x = (t + 5)^{-1}$. The acceleration of particle is proportional to [AIPMT 2010 (Prelims)]

- (1) (velocity) $^{3/2}$ (2) (distance) ^{2}
(3) (distance) $^{-2}$ (4) (velocity) $^{2/3}$

Scan or tap for the full solution 

Q.8 A particle moving along x -axis has acceleration f , at time t , given by $f = f_0 \left(1 - \frac{t}{T}\right)$, where f_0 and T are constants. The particle at $t = 0$ has zero velocity. In the time interval between $t = 0$ and the instant when $f = 0$, the particle's velocity (v_x) is [AIPMT 2007]

- (1) $\frac{1}{2}f_0 T^2$ (2) $f_0 T^2$ (3) $\frac{1}{2}f_0 T$ (4) $f_0 T$

Scan or tap for the full solution 

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

- (1) 54 m (2) 81 m (3) 24 m (4) 32 m

Scan or tap for the full solution 

Q.10 A particle moves along a straight line OX. At a time t (in seconds) the distance x (in metres) of the particle from O is given by $x = 40 + 12t - t^3$. How long would the particle travel before coming to rest? [AIPMT 2006]

- (1) 16 m (2) 24 m (3) 40 m (4) 56 m

Scan or tap for the
full solution



Q.11 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

[AIPMT 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.

Scan or tap for the
full solution



Q.12 Motion of a particle is given by equation $s = (3t^3 + 7t^2 + 14t + 8)$ m. The value of acceleration of the particle at $t = 1$ s is

[AIPMT 2000]

- (1) 10 m/s^2 (2) 32 m/s^2 (3) 23 m/s^2 (4) 16 m/s^2

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	4	1	4	2	4	1	3	1	1	4
Ques.	12										
Ans.	2										