

PYQSide

JEE MAIN MOTION IN A STRAIGHT LINE — PYQS

Max. Marks: 64

Questions: 16

Section A (MCQ)

- Q.1** A gas balloon is going up with a constant velocity of 10 m/s. When this balloon reached a height of 75 m, a stone is dropped from it and balloon keeps moving up with the same velocity. The height of the balloon when the stone hits the ground is _____ m. (Take $g = 10 \text{ m/s}^2$)

[JEE Main 2026 (Online) 8th April Evening Shift]

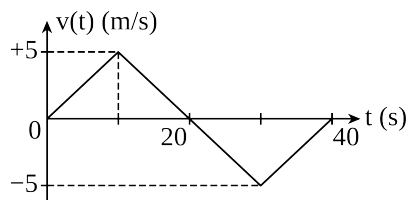
- (1) 85 (2) 150 (3) 129 (4) 125

Scan or tap for the
full solution



- Q.2** The velocity (v) versus time (t) plot of a particle is shown in the figure, for a time interval of 40 s. The total distance travelled by the particle and the average velocity during this period are, respectively _____.

[JEE Main 2026 (Online) 5th April Evening Shift]



- (1) 25 m and zero (2) 50 m and zero
(3) 100 m and zero (4) 100 m and 2.5 m/s

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full solution



- Q.3** Two cars A and B are moving in the same direction along a straight line with speeds 100 km/h and 80 km/h, respectively such that car A is moving ahead of car B. A person in car B throws a stone with a speed v so that it hits the car A with a speed of 5 m/s. The value of v is _____ km/h.

[JEE Main 2026 (Online) 4th April Evening Shift]

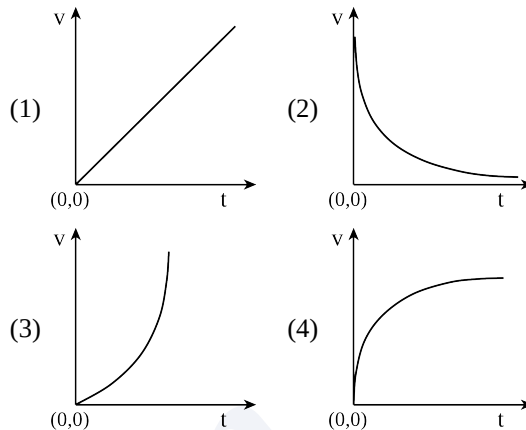
- (1) 18 (2) 28 (3) 38 (4) 48

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- Q.4** A particle of mass m falls from rest through a resistive medium having resistive force, $F = -kv$, where v is the velocity of the particle and k is a constant. Which of the following graphs represents velocity (v) versus time (t) ?

[JEE Main 2026 (Online) 28th January Morning Shift]



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- Q.5** Water drops fall from a tap on the floor, 5 m below, at regular intervals of time, the first drop strikes the floor when the sixth drop begins to fall. The height at which the fourth drop will be from ground, at the instant when the first drop strikes the ground is _____ m.

(g = 10 m/s²)

[JEE Main 2026 (Online) 28th January Morning Shift]

- (1) 3.8 (2) 4.0 (3) 4.2 (4) 2.5

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- Q.6** A particle starts moving from time $t = 0$ and its coordinate is given as $x(t) = 4t^3 - 3t$
- The particle returns to its original position (origin) 0.866 units later
 - The particle is 1 unit away from origin at its turning point
 - Acceleration of the particle is non-negative
 - The particle is 0.5 units away from origin at its turning point
 - Particle never turns back as acceleration is non-negative

Choose the **correct** answer from the options given below :

[JEE Main 2026 (Online) 28th January Evening Shift]

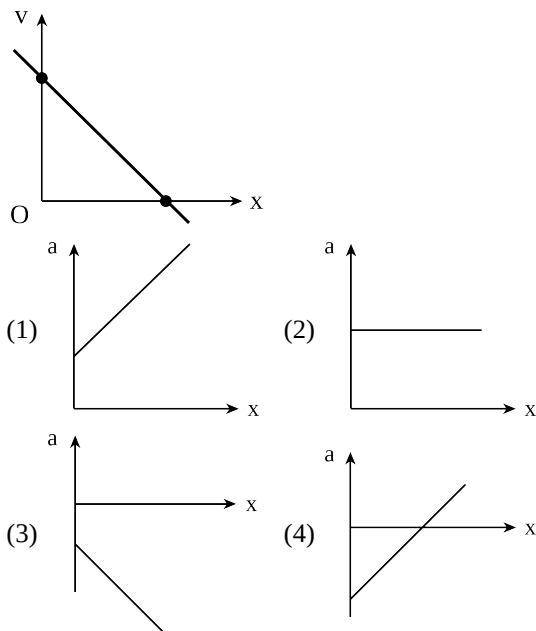
- (1) A, C, D Only (2) A, B, C Only
(3) C, E Only (4) A, C Only

Scan or tap for the
full solution



- Q.7** The velocity (v) – distance (x) graph is shown in figure. Which graph represents acceleration (a) versus distance (x) variation of this system?

[JEE Main 2026 (Online) 24th January Evening Shift]



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- Q.8** A paratrooper jumps from an aeroplane and opens a parachute after 2 s of free fall and starts decelerating with 3 m/s^2 . At 10 m height from ground, while descending with the help of parachute, the speed of paratrooper is 5 m/s. The initial height of the aeroplane is _____ m. ($g = 10 \text{ m/s}^2$)

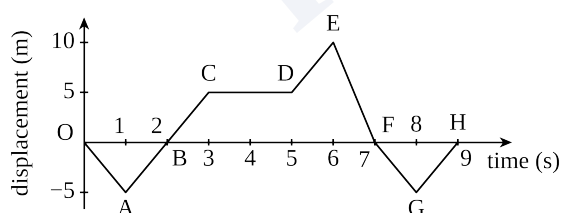
[JEE Main 2026 (Online) 23rd January Evening Shift]

- (1) 92.5 (2) 62.5 (3) 20 (4) 82.5

Scan or tap for the full solution



- Q.9** The displacement x versus time graph is shown below.



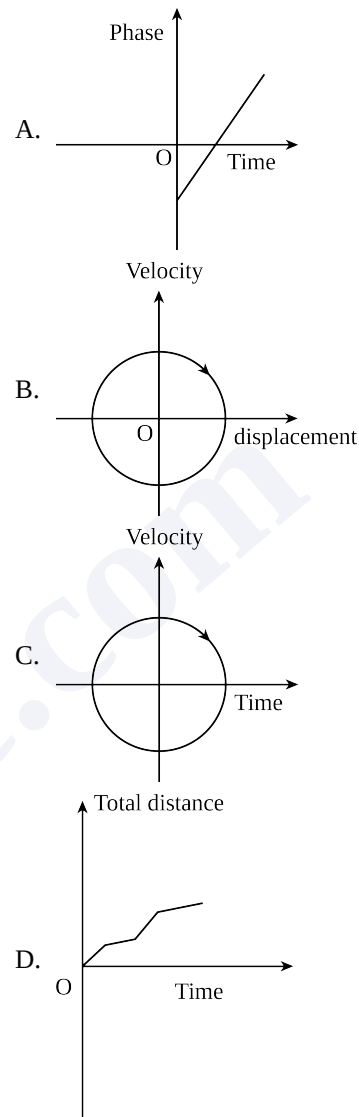
- A. The average velocity during 0 to 3 s is 10 m/s
 B. The average velocity during 3 to 5 s is 0 m/s
 C. The instantaneous velocity at $t = 2 \text{ s}$ is 5 m/s
 D. The average velocity during 5 to 7 s and instantaneous velocity at $t = 6.5 \text{ s}$ are equal
 E. The average velocity from $t = 0$ to $t = 9 \text{ s}$ is zero
 Choose the correct answer from the options given below : [JEE Main 2025 (Online) 4th April Evening Shift]

- (1) (B), (C), (D) only (2) (B), (D), (E) only
 (3) (A), (D), (E) only (4) (B), (C), (E) only

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- Q.10** Which of the following curves possibly represent one-dimensional motion of a particle?



Choose the correct answer from the options given below : [JEE Main 2025 (Online) 3rd April Morning Shift]

- (1) A, B and C only (2) A, C and D only
 (3) A, B and D only (4) A and B only

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- Q.11** A particle moves along the x -axis and has its displacement x varying with time t according to the equation:
 $x = c_0(t^2 - 2) + c(t - 2)^2$
 where c_0 and c are constants of appropriate dimensions.

Then, which of the following statements is correct?

[JEE Main 2025 (Online) 3rd April Evening Shift]

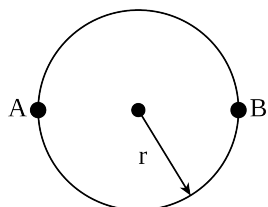
- (1) the acceleration of the particle is $2(c + c_0)$
 (2) the acceleration of the particle is $2c_0$
 (3) the acceleration of the particle is $2c$
 (4) the initial velocity of the particle is $4c$

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- Q.12** A sportsman runs around a circular track of radius r such that he traverses the path ABAB. The distance travelled and displacement, respectively, are

[JEE Main 2025 (Online) 2nd April Evening Shift]



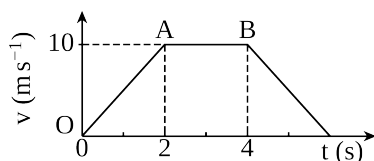
- (1) $\pi r, 3r$ (2) $2r, 3\pi r$ (3) $3\pi r, 2r$ (4) $3\pi r, \pi r$

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- Q.13** The velocity-time graph of an object moving along a straight line is shown in the figure. What is the distance covered by the object between $t = 0$ to $t = 4$ s?

[JEE Main 2025 (Online) 28th January Evening Shift]



- (1) 11 m (2) 30 m (3) 13 m (4) 10 m

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Section B (Numerical)

- Q.14** Two masses of 3.4 kg and 2.5 kg are accelerated from an initial speed of 5 m/s and 12 m/s, respectively. The distances traversed by the masses in the 5th second are 104 m and 129 m, respectively. The ratio of their momenta after 10 s is $\frac{x}{8}$. The value of x is _____.

[JEE Main 2026 (Online) 8th April Evening Shift]

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- Q.15** From 18 m height above the ground a ball is dropped from rest. The height above the ground at which the magnitude of velocity equal to the magnitude of acceleration (in the same set of units) due to gravity is _____ m.
 (Take $g = 10 \text{ m/s}^2$ and neglect the air resistance)

[JEE Main 2026 (Online) 5th April Morning Shift]

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- Q.16** A person travelling on a straight line moves with a uniform velocity v_1 for a distance x and with a uniform velocity v_2 for the next $\frac{3}{2}x$ distance. The average velocity in this motion is $\frac{50}{7} \text{ m/s}$. If v_1 is 5 m/s then $v_2 =$ _____ m/s.

[JEE Main 2025 (Online) 2nd April Morning Shift]

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ANSWER KEY

Section A (MCQ)

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	3	3	4	3	2	4	1	4	3	1
Ques.	12	13									
Ans.	3	2									

Section B (Numerical)

Ques.	14	15	16								
Ans.	9	13	10								