DPP No.: A13 (JEE-ADVANCED)

Total Marks: 42 Max. Time: 27 min. Single choice Objective ('-1' negative marking) Q.1 to Q.2 (3 marks 2 min.) [06, 04] One or more than one options correct type ('-1' negative marking) Q.3 to Q.8 (4 marks 2 min.) [24, 12] Subjective Questions ('-1' negative marking) Q.9 (4 marks 5 min.) [04, 05] Match the Following (no negative marking) Q.10 (8 marks 6 min.) [08, 06]

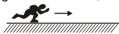
- 1. Find area under the curve $y = 5e^x$ and the x-axis, between x = 0 and x = 2:
 - (A) 5e²
- (B) $e^2 1$
- (C) $5(e^2 1)$
- (D) $\frac{e^2-1}{5}$
- 2. A car starts from rest and moves with constant acceleration. The ratio of the distance covered in the nth second to distance covered in n seconds is:
 - (A) $\frac{2}{n^2} \frac{1}{n}$

- (B) $\frac{2}{n^2} + \frac{1}{n}$ (C) $\frac{2}{n} \frac{1}{n^2}$ (D) $\frac{1}{n} + \frac{1}{n^2}$
- A particle is moving in a straight line. Its displacement at time t is given by $s = -4t^2 + 2t$, then its 3. velocity and acceleration at time $t = \frac{1}{2}$ second are
 - (A) velocity of the particle is -2 m/s
- (B) velocity of the particle is 4 m/s
- (C) acceleration of the particle is -8 m/s²
- (D) acceleration of the particle is 6 m/s²
- 4. From the top of a tower of height 200 m, a ball A is projected up with 10 m s⁻¹ and two seconds later another ball B is projected vertically down with the same speed. Then choose the correct option(s): (Take $g = 10 \text{ m/s}^2$)
 - (A) both A and B will reach the ground simultaneously
 - (B) the ball A will hit the ground 2 seconds later than B hitting the ground
 - (C) both the balls will hit the ground with the same velocity
 - (D) none of these

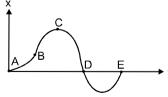
- **5.** The magnitude of the displacement is equal to the distance covered in a given interval of time if the particle. Then choose the correct option(s)
 - (A) moves with constant acceleration along any path
 - (B) moves with constant speed
 - (C) moves in same direction with constant velocity or with variable velocity
 - (D) have acceleration and velocity in same direction.

Comprehension: (6 to 8)

If a man has a velocity varying with time given as $v = 3t^2$, v is in m/s and t in sec then:



- **6.** Regarding the velocity of man choose the correct option(s):
 - (A) velocity of man after t = 3 sec is 27 m/s
 - (B) velocity of man after t = 3 sec is 9 m/s
 - (C) average velocity of man during t = 0 to t = 3 sec is 9 m/s
 - (D) average velocity of man during t = 0 to t = 3 sec is 27 m/s
- 7. Based on above comprehension choose the correct option(s) regarding displacement of particle:
 - (A) displacement of particle after 2 seconds of his start is 8m
 - (B) displacement of particle after 2 seconds of his start is 12m
 - (C) ratio of displacement of particle during first 2 seconds and next 2 seconds is 1:7
 - (D) ratio of displacement of particle during first 2 seconds and next 2 seconds is 7:1
- **8.** Regarding acceleration of man choose the correct option(s)
 - (A) acceleration of man after t = 3 second is 18 m/s^2
 - (B) average acceleration of man during t = 0 to t = 3 seconds is 18 m/s^2
 - (C) average acceleration of man during t = 0 to t = 3 seconds is 9 m/s^2
 - (D) acceleration of man after t = 3 second is 12 m/s²
- 9. If \vec{A} and \vec{B} are two non-zero vectors such that $|\vec{A} + \vec{B}| = \frac{|\vec{A} \vec{B}|}{2}$ and $|\vec{A}| = 2|\vec{B}|$ then the angle between \vec{A} and \vec{B} is θ such that $\cos \theta = -\frac{m}{n}$ (where m and n are positive integers and $\frac{m}{n}$ is in lowest form) then find m + n
- **10.** A particle is moving along x-axis. Its position (x) varies with time (t) is shown in the graph. Points A,B,C,D and E are also given in the graph. Here positive values of velocity and acceleration means they are towards +x direction and their negative values means that they are towards −x direction. Match the column–I, according the correct results given in column–II. (Centre of curvature of BD is below the graph but centre of curvature of AB and DE is above the graph)

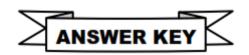


Coulmn-I

- (A) From point A to B
- (B) From point B to C
- (C) From point C to D
- (D) From point D to E

Column-II

- (p) acceleration of the particle is positive
- (q) acceleration of the particle is negative
- (r) velocity of the particle is positive or zero
- (s) speed is increasing



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1. (C) 2. (C) 3. (A,C) 4. (A,C) 5. (C,D) 6. (A,C) 7. (A,C)

8. (A,C) **9.** 7 **10.** (A) -p,r,s; (B) -q,r; (C) -q,s; (D) -p