PHYSICS

(A) 1.6

Single Correct Answer Type

1. The acceleration of a particle which moves along the positive x-axis varies with its position as shown. If the velocity of the particle is 0.8 m/s at x = 0, the velocity of the particle at x = 1.4 is (in m/s) :-

SECTION-I



3. Having gone through a plank of thickness h, a bullet changed its velocity from v_0 to v. Find the time of motion of the bullet in the plank, assuming the resistance force to be proportional to the square of the velocity.

$$(A) t = \frac{h(v_0 + v)}{v_0 v \ln(v_0 / v)} \quad (B) t = \frac{v_0 v \ln(v_0 / v)}{h(v_0 - v)} \quad (C) t = \frac{h(v_0 - v)}{v_0 v \ln(v_0 / v)} \quad (D) t = \frac{h(v_0 - v)}{v_0 v \ln(v \times v_0)}$$

4. If a particle moves along a straight line according to the law v=2 (x sinx + cos x) then find its acceleration

(i.e.
$$\frac{dv}{dt}$$
) at $x = \pi/2$:-

(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{2\sqrt{2}}$ (C) $\frac{\pi}{4\sqrt{2}}$ (D) zero

Multiple Correct Answer Type

5. Velocity time graph of a particle is as shown in figure which have geometry of a circle. At t = 0 particle is at origin.

 v_{max} $\frac{\sqrt{3} \pi}{4}$ m/s π 3π π sec



(B) Displacement of particle from t = 0 to $t = \frac{\pi}{4}$ sec is $\frac{\pi^3}{32}$ m

(B) 1.2

- (C) Displacement of particle from t = 0 to $\frac{\pi}{4}$ sec is $\frac{\sqrt{3}\pi^2}{32}$ m
- (D) Magnitude of acceleration of particle first decreases than increases.

3 Q. [Marks 4 (0)]

4 Q. [Marks 3 (-1)]

(D) None of these

CLASS TEST # 04



6. A particle is moving on a straight line along x-direction. A graph between square of its velocity & position is drawn as shown below. Choose the **CORRECT** statement(s) :-



- (A) Acceleration of the particle is 0.8 m/s^2 for $0 \le x \le 10$.
- (B) Acceleration of the particle is -3.2 m/s^2 for 10 < x < 15.
- (C) Velocity of particle first increases linearly with position till 10m & then decreases linearly with position till 15 m.
- (D) The particle's velocity increase linearly with time for first five seconds & decreases linearly with time till it stops.
- 7. The acceleration-displacement graph of a particle moving in x-direction is shown. If the initial speed of the particle is $\vec{u} = -3\hat{i}$ m/s, the velocity of the particle at s=3m is-





A particle starts from rest from the origin at the instant t = 0 s and moves along the x-axis. During first 15s of its motion, it is subjected to accleration, which varies according to the given graph. After the isntant t = 15 s acceleration vanishes.



8. Its speed increases during the time interval or intervals (A) 0 s to 3 s only (B) 0 s to 5 s only(C) 0 s to 3 s and 13.5 s to 15 s (D) 0 s to 5 s and 13.5 s to 15 s 9. Its speed decreases during the time interval (A) 3 s to 5 s(B) 3 s to 6 s(C) 5 s to 6 s (D) 5 s to 13.5 s 10. It reverses direction of motion at the instant (A) t = 3 s(B) t = 5 s(C) t = 6 s(D) t = 13.5 s

Paragraph for Question 11 to 13



11.	What is the displacement (in m) in 40 sec?				
	(A) 450	(B) 500	(C) 400	(D) 600	
12.	What is the velocity (in m/s) at $t = 12$ sec?				
	(A) 19	(B) 18	(C) 20	(D) 21	

13. For what time in seconds (t > 0) the displacement of the particle is zero?

(A) $2\sqrt{60} + 30$ (B) $2\sqrt{63} + 30$ (C) $2\sqrt{67} + 30$ (D) $2\sqrt{65} + 30$

Paragraph for Question No. 14 to 16

A long straight road connects two towns A and B. There are two small towns C and D between towns A & B. The condition of road between towns C and D is bad. Two cars travel from A to B at constant speed v_1 everywhere except between towns C and D where they travel at speed v_2 . In the following graph, separation between the cars is shown w.r.t. time for a time interval of 80 seconds.



SECTION-II

Numerical Answer Type Question

1 Q. [3(0)]

(upto second decimal place)

1. A big Diwali rocket is projected vertically upward so as to attain a maximum height of 160m. The rocket explodes just as it reaches the top of its trajectory sending out luminous particles in all possible directions all with same speed v. The display, consisting of the luminous particles, spreads out as an expanding, brilliant sphere. The bottom of this sphere just touches the ground when its radius is 80m. With what speed (in m/s) are the luminous particles ejected by the explosion?

SECTION-III

Numerical Grid Type (Single digit Ranging from 0 to 9) **2 Q.** [Marks 4(0)]

1. The acceleration of a marble in a certain fluid is proportional to the speed of the marble squared and is

given (in SI units) by $a = -\frac{v^2}{3}$ for v > 0. If the marble enters this fluid with a speed of 1.50 m/s, how

long will it take before the marble's speed is reduced to half of its initial value?

2. A particle moves along a straight line. The acceleration of particle as function of time is given by a = 6t - 12. Initial velocity of particle is 9 m/s and distance traveled by particle in 5 sec is 7x (in m). Find the value of x.

SECTION-IV

Matrix Match Type (4×5)

1 Q. [8 M (for each entry +2(0)]

1. Study the velocity-time graph pictured below and match each segment of the graph with the description of this motion at that time.



Column-I

- (A) The object is motionless in
- The object is moving with constant velocity in **(B)**
- (C) The object is having acceleration in
- The object is travelling in north but accelerating in south in (D)

- Column-II
- (P) Segment
- Segment (Q)
- Segment (R)
- (S) Segment
- Segment (T)

CLASS TEST # 04			ANSWER KEY			
SECTION-I						
Single Correct Answe	r Type		4 Q. [Marks 3 (-1)]			
1. Ans. (B)	2. Ans. (C)	3. Ans. (C)	4. Ans. (D)			
Multiple Correct Ans	wer Type		3 Q. [Marks 4 (0)]			
5. Ans. (A, D)	6. Ans. (A, D)	7. Ans. (C,D)				
Linked Comprehension	on Type	(3 Para × 3 Q.) []	(3 Para × 3 Q.) [Marks 3 (–1)]			
8. Ans. (D)	9. Ans. (D)	10. Ans. (D)	11. Ans. (C)			
12. Ans. (B)	13. Ans. (D)	14. Ans. (D)	15. Ans. (B)			
16. Ans. (C)						
SECTION-II						
Numerical Answer Ty	pe Question		1 Q. [3(0)]			
(upto second decimal place)						
1. Ans. 20.00	•					
SECTION-III						
Numerical Grid Type	iging from 0 to 9)	2 Q. [Marks 4(0)]				
1. Ans. 2 s	2. Ans. 4					
	SEC	CTION-IV				
Matrix Match Type (4×5) 1 Q. [8 M (for each entry +2(0)]						
1. Ans. (A) \rightarrow T; (B) \rightarrow Q; (C) \rightarrow PRS; (D) \rightarrow PS						