



# PHYSICS

## AAKASH INSTITUTE ENGLISH

### Mock test 03

#### Example

1. The acceleration of a particle which starts from rest varies with time according to

relation  $a=2t+3$ . The velocity of the particle at time  $t$  would be

A.  $2t^3 + 3$

B.  $t^2 + 3t$

C.  $2t^2 + 3t$

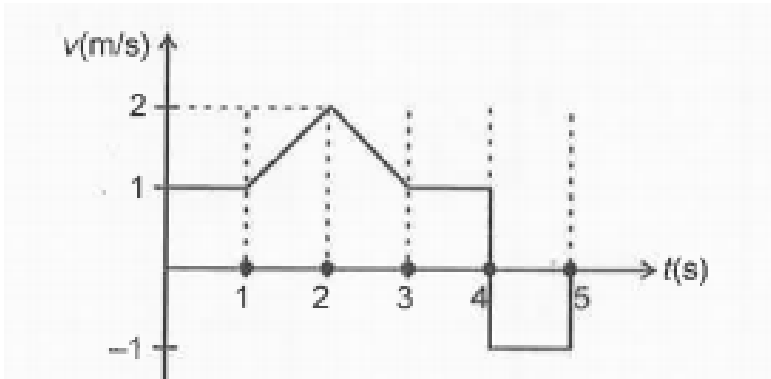
D. zero

**Answer: B**



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2. The velocity-time graph of a body is shown below. The displacement covered by body in 5 s is



s is

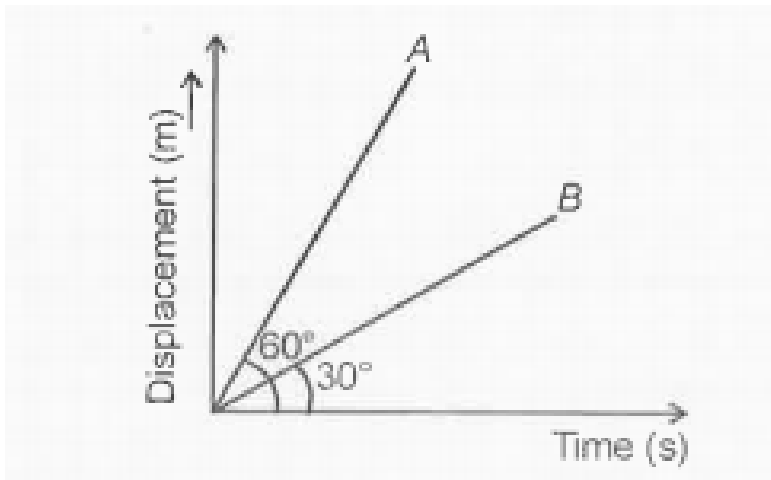
- A. 2m
- B. 4m
- C. 3m
- D. 1m

**Answer: B**



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3. The ratio of velocities represented by lines A and B in the graph below is



A. 1 : 1

B. 1 : 2

C. 3 : 1

D. 1 : 3

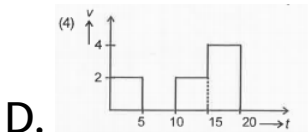
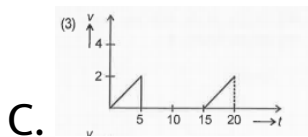
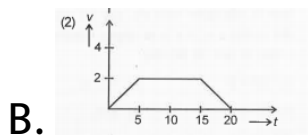
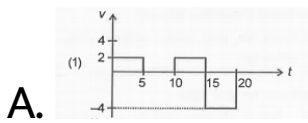
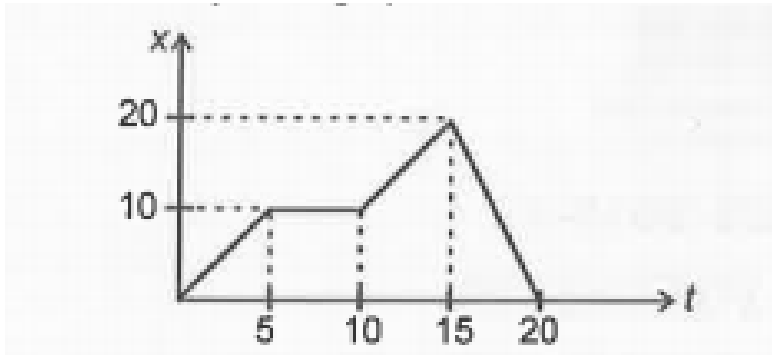
**Answer: C**



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4. Graph of displacement (X) VS time (t) is given below for a particle moving in one-dimensional motion. The velocity time graph

for this case would be



**Answer: A**



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5. The motion of a body falling from rest in a medium is given by equation,  $\frac{dv}{dt} = 1 - 2v$ .

The velocity at any time  $t$  is

A.  $(1 - e^t)$

B.  $(1 - e^{-t})$

C.  $\frac{1}{2}(1 - e^t)$

D.  $\frac{1}{2}(1 - e^{-2t})$

**Answer: D**



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6. A body starting from rest is moving with a uniform acceleration of  $8\frac{m}{s^2}$ . Then the distance travelled by it in 5th second will be

A. 2.00 m

B. 2.56 m

C. 36 m

D. 0.0 m

**Answer: C**





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7. The acceleration of a particle, given by relation,  $a = -5\omega^2 \sin(\omega t)$ . At  $t=0$ ,  $x=0$  and  $v = 5\omega$ . The displacement of this particle at time  $t$  will be

A.  $-5 \sin(\omega t)$

B.  $5 \sin(\omega t)$

C.  $5 \cos(\omega t)$

D.  $-5 \cos(\omega t)$

**Answer: B**

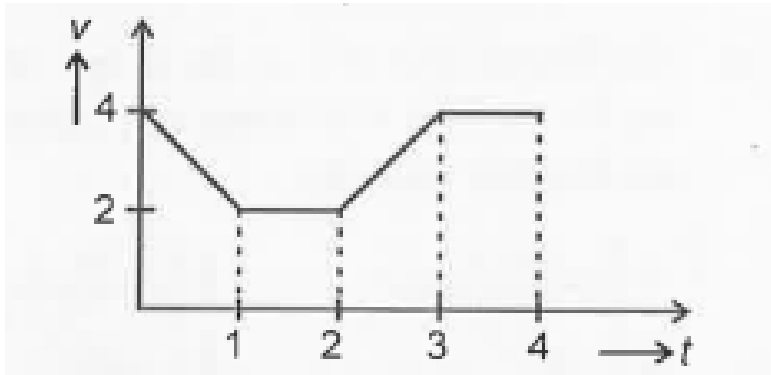


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**8.** The velocity-time graph for a moving body is shown in figure below. If body moves in straight line along x-axis without changing its direction, then total displacement of body

would

be



A. 15 m

B. 10 m

C. 12 m

D. zero

**Answer: C**



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9. An object is subjected to retardation,  $\frac{dv}{dt} = -5\sqrt{v}$ , which has initial velocity of  $4ms^{-1}$ . The time taken by the object to come to rest would be

A. 2 s

B.  $\frac{5}{4}s$

C.  $\frac{4}{5}s$

D.  $\frac{1}{2}s$

**Answer: C**



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10. The acceleration  $a$  of a particle in  $\frac{m}{s^2}$  is given by  $a = 18t^2 + 36t + 120$ . If the particle starts from rest, then velocity at end of 1 s is

A. 122 m/s

B. 140 m/s

C. 144 m/s

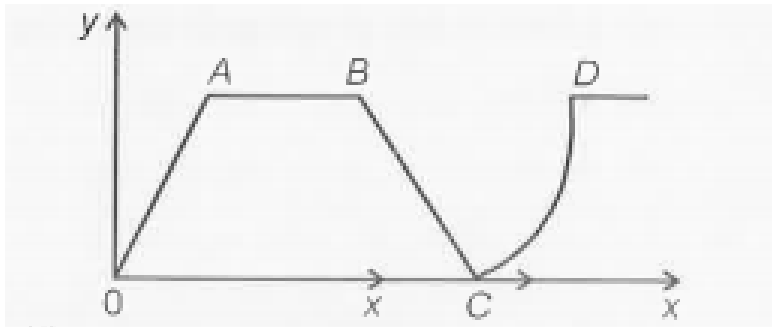
D. 120 m/s

**Answer: C**



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11. In the following graph, the slope of curve AB, BC and CD are



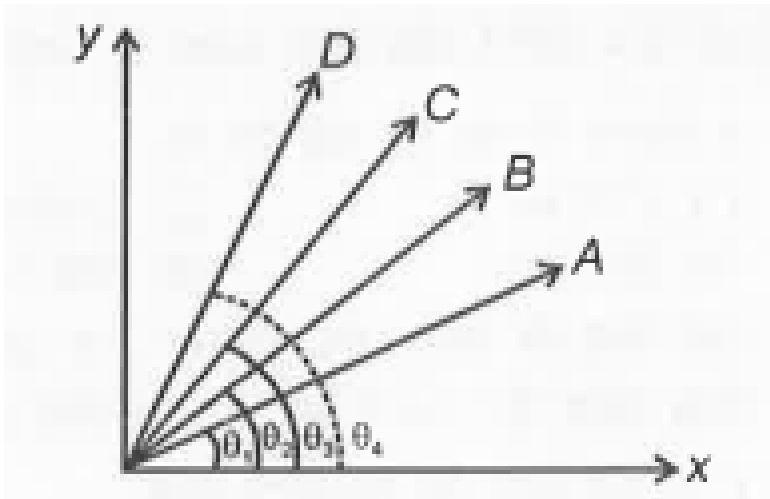
- A. Zero, positive, negative
- B. Zero, zero, variable
- C. Positive, negative, variable

D. Zero, negative, variable

**Answer: D**

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12. Which of the following option is correct about given graph?



A. A and B have minimum value of slope

B. B has minimum value of slope

C. D has maximum value of slope

D. A, B, C and D have same value of slope

**Answer: C**

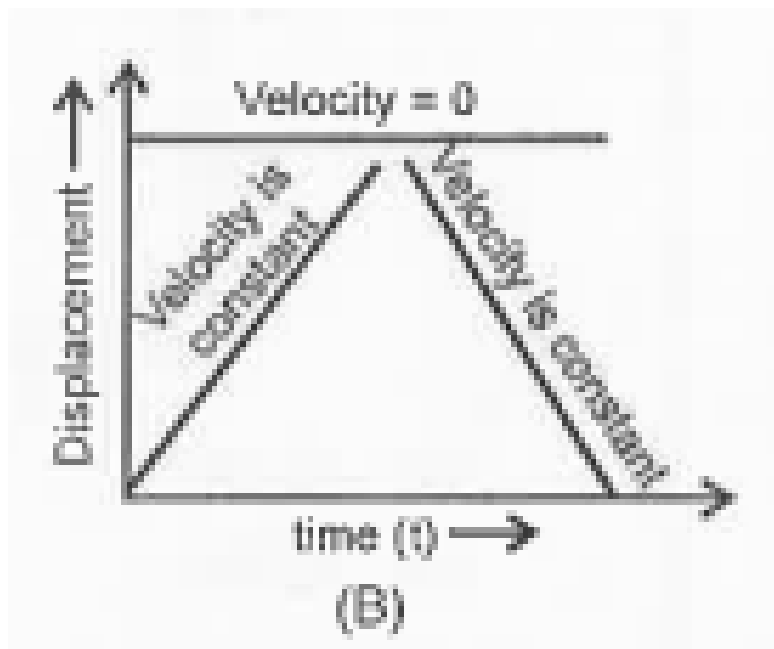
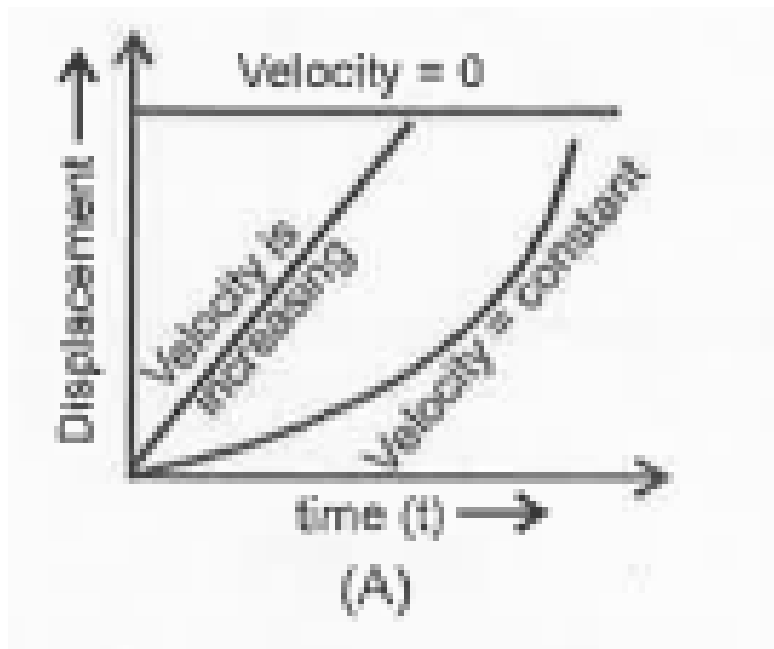


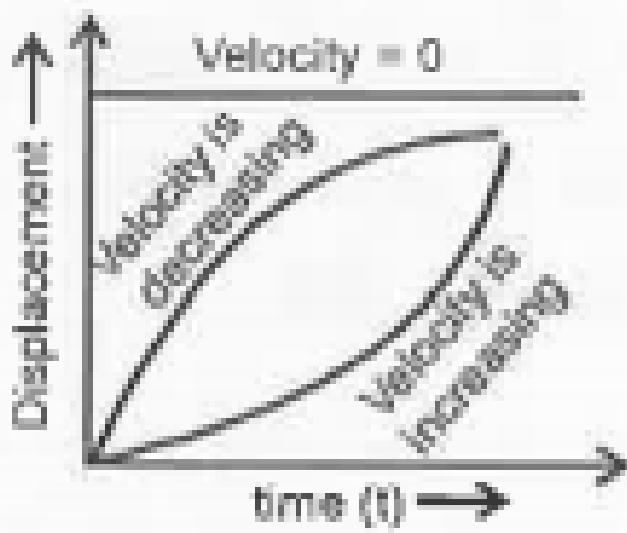
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**13.** Some characteristics of velocity on displacement-time graph are shown on graphs below. Which graph correctly represents the

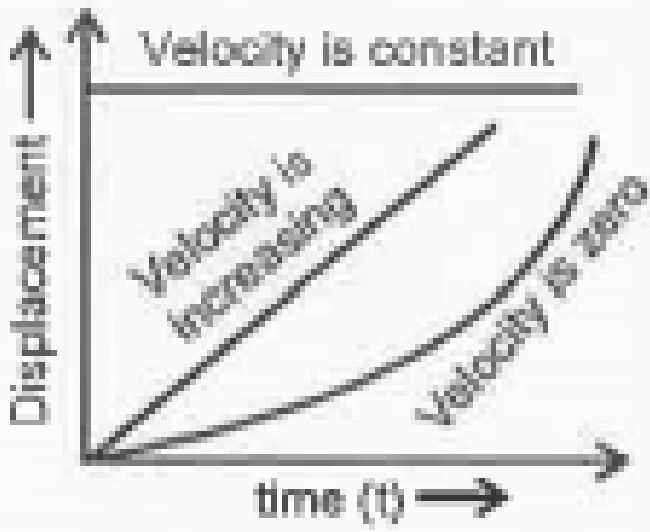


characteristics :





(C)



(D)

A. Only A

B. Both B & C

C. Both C & D

D. Only B

**Answer: B**



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**14.** A particle moves along a straight line on  $y$ -axis. The distance of the particle from O varies with time and is given by :  $y = 20t - t^2$ . The

distance travelled by the particle before it momentarily comes to rest is

A. 200 m

B. 100 m

C. 50 m

D. 150 m

**Answer: B**



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15. A bus starts from rest and moves with acceleration  $a = 2\frac{m}{s^2}$ . The ratio of the distance covered in  $6^{th}$  second to that covered in 6 seconds is

A. 11:36

B. 11:34

C. 34:11

D. 36:11

**Answer: A**



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16. A car covers first half of total distance at speed of 50 km/h and other half at the rate of 80 km/h. The average speed of car would be

A. 60.5 km/h

B. 61.5 km/h

C. 100 km/h

D. 58.5 km/h

**Answer: B**





17. Draw a labelled ray diagram for the formation of image by a convex lens of focal length 15 cm when the object is placed is placed at a distance of 25 cm from the lens. Determine the size of the image formed, if size of the object is 4 cm.

A. 1000 m

B. 1500 m

C. 2000 m

D. 2500 m

**Answer: B**



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**18.** A particle moves in a straight line with acceleration proportional to  $x^2$ , ( Where  $x$  is displacement). The gain of kinetic energy for any displacement is proportional to

A.  $x^3$



B.  $x^{\frac{1}{3}}$

C.  $x^{\frac{2}{3}}$

D.  $x^2$

**Answer: A**



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**19.** A particle moving in a straight line covers first half of the distance into two equal time intervals with speed of 2 m/s and 4 m/s

respectively, and second half with the speed of 5 m/s. The average speed of the particle is

A. 4.75 m/s

B. 4.25 m/s

C. 4.00 m/s

D. 3.75 m/s

**Answer: D**



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20. A body is moving with constant acceleration,  $a = 5 \frac{m}{s^2}$  from A to B in straight line AB. The velocity of particle at A and B are 5 m/s and 15 m/s respectively. The velocity at mid-point of AB is

A.  $\sqrt{125} \frac{m}{s}$

B.  $\sqrt{250} \frac{m}{s}$

C.  $\sqrt{550} \frac{m}{s}$

D.  $\sqrt{600} \frac{m}{s}$

**Answer: A**



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21. The initial velocity of a particle is  $x \text{ ms}^{-1}$  (at  $t=0$ ) and acceleration  $a$  is function for time, given by,  $a= 6t$ . Which of the following relation is correct for final velocity  $y$  after time  $t$ ?

A.  $y = x + \frac{1}{2}(6t)^2$

B.  $y = x^2 + (6t)$

C.  $y = x + 3t^2$

D.  $y = x + at$

**Answer: C**



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**22.** Initially a car is moving with speed of  $20\text{ms}^{-1}$  and covers a distance of 100 m before it comes to rest. On making the initial speed of car  $40\text{ms}^{-1}$  keeping the acceleration same, the distance travelled by car before it comes to rest is

A. 200 m

B. 300 m

C. 400 m

D. 800 m

**Answer: C**



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**23.** A body moves along x-axis such that its displacement varies with time as given,  $x = 7 + 3t + 5t^2$ . The average velocity during 3rd second is

A.  $28ms^{-1}$

B.  $42ms^{-1}$

C.  $56ms^{-1}$

D.  $15ms^{-1}$

**Answer: A**



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**24.** The displacement of a moving particle is given by,  $x = at^3 + bt^2 + ct + d$ . The acceleration of particle at  $t=3$  s would be

A.  $2(a+9b)$

B.  $2(9a+b)$

C.  $9(a+b)$

D.  $3(2a+b)$

**Answer: B**



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**25.** A particle moves along straight line for 10 second with unifrom acceleration,  $a = 2ms^{-2}$ . Then for next 10 second moves with



acceleration,  $a = 4ms^{-1}$ . The total displacement of particle would be (initial velocity of particle is zero)

A. 400 m

B. 500 m

C. 550 m

D. 650 m

**Answer: B**



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26. The velocity of a bullet is reduced from  $400\text{ms}^{-1}$  to  $100\text{ms}^{-1}$  while travelling through a material of thickness of 1 m. The retardation will be

A.  $7.5 \cdot 10^4 \frac{\text{m}}{\text{s}^2}$

B.  $8.5 \cdot 10^3 \frac{\text{m}}{\text{s}^2}$

C.  $7.5 \cdot 10^2 \frac{\text{m}}{\text{s}^2}$

D.  $8.5 \cdot 10^2 \frac{\text{m}}{\text{s}^2}$

**Answer: A**



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27. A particle starting from rest attains a velocity of  $50\text{ms}^{-1}$  in 5 s. The acceleration of the particle is

A.  $5\frac{\text{m}}{\text{s}^2}$

B.  $10\frac{\text{m}}{\text{s}^2}$

C.  $50\frac{\text{m}}{\text{s}^2}$

D.  $100\frac{\text{m}}{\text{s}^2}$

**Answer: B**



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28. The position of a particle along x-axis at time  $t$  is given by  $x = 1 + t - t^2$ . The distance travelled by the particle in first 2 seconds is

- A. 1 m
- B. 2 m
- C. 2.5 m
- D. 3 m

**Answer: C**



**29.** A car moves a distance of 100 m. It covers first half with speed of 10 m/s and another half with speed of  $v$  m/s. If the average speed of car is 18 m/s, then value of  $v$  is

A. 60 m/s

B. 80 m/s

C. 90 m/s

D. 110 m/s

**Answer: C**



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**30.** A juggler maintain 10 balls in motion, making each of them to rise at a height of 80 m from his hands. To keep proper distance between them, the time interval maintained by juggler would be

A. 0.6 s

B. 0.8 s

C. 1.0 s

D. 1.2 s

**Answer: B**



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**31.** A stone is thrown downwards with velocity  $10 \text{ m/s}$  from the roof of a building and it reaches the ground with speed  $40 \text{ m/s}$ . the height of the building would be

A. 75 m

B. 100 m

C. 125 m

D. 150 m

**Answer: A**



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**32.** A stone falls freely such that the distance covered by it in the last second of its motion is



equal to the distance covered by it in the first 5 seconds. It remained in air for :-

A. 16.5 s

B. 17 s

C. 15 s

D. 13 s

**Answer: D**



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33. truck is moving with a speed of 15 m/s. A car chasing this truck with a speed of 10 m/s fires a bullet at truck with muzzle velocity 90 km/h. The speed with which the bullet hit the truck is

- A. 15 m/s
- B. 20 m/s
- C. 25 m/s
- D. 30 m/s

**Answer: B**



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**34.** A car 2 m long travelling at  $30ms^{-1}$  overtakes another car 4 m long travelling at  $20ms^{-1}$ . The time taken by the first car to pass the second car is

A. 0.2 s

B. 0.4 s

C. 0.6 s

D. 0.8 s

**Answer: C**



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**35.** A stone is dropped from roof of building takes 5 s to reach the ground. The sound of striking is heard after 5.4 second after the stone is dropped. The velocity of sound is

A.  $312.5ms^{-1}$

B.  $332.5ms^{-1}$

C.  $352ms^{-1}$

D.  $392ms^{-1}$

**Answer: A**



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**36.** A ball is dropped from top of a tower 250 m high. At the same time, another ball is thrown upwards with a velocity of  $50ms^{-1}$  from the ground. The time at which they cross each other is

A. 3 second

B. 5 second

C. 10 second

D. 12 second

**Answer: B**



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**37.** A packet is dropped from a helicopter rising up with velocity  $2ms^{-1}$ . The velocity of the packet after 2 seconds will be

A. 18 m/s

B. 10 m/s

C. 8 m/s

D. 2 m/s

**Answer: A**



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**38.** When a ball is thrown vertically upwards it goes through a distance of 19.6 m. Find the initial velocity of the ball and the time taken

by it to rise to the high point (Acceleration due to gravity  $g=9.8 \text{ m/s}^2$ )



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**39.** A parachutist drops freely from helicopter for 20 s before the parachute opens out. Then he descends with retardation of  $40 \frac{m}{s^2}$ . The height of the helicopter from the ground level is 2500m. When he drops out, his velocity on reaching the ground will be

A.  $10ms^{-1}$



B.  $10\sqrt{10}ms^{-1}$

C.  $20ms^{-1}$

D. zero

**Answer: A**



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**40.** Which of the following option is correct regarding freely falling object?

A. Initial velocity of object must be zero

B. Object is moving under the influence of gravity

C. Acceleration of object is zero

D. Both (1) & (2)

**Answer: B**



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**41.** A 200 m long train moving with velocity  $20\text{m s}^{-1}$  overtakes a man running in the same direction in 20 seconds. How long the train

will take to overtake the man if he was running  
in opposite direction?

A.  $\frac{10}{3} s$

B.  $\frac{20}{3} s$

C.  $\frac{5}{3} s$

D.  $3s$

**Answer: B**



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42. An object is dropped from rest. If it falls distance  $x$  during first second and additional distance  $y$  in next two seconds. Then ratio of  $\frac{x}{y}$  is

A. 1 : 4

B. 1 : 1

C. 8 : 1

D. 1 : 8

**Answer: D**

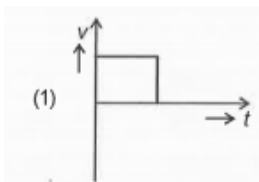


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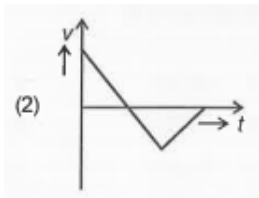
**43.** A ball thrown vertically upward with initial velocity  $u$ . Which of the following graphs represent the velocity of ball correctly as function of time?

(Take upward direction as positive)

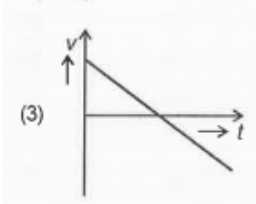
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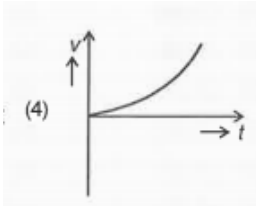
B.



C.



D.



**Answer: C**



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**44.** Two cars move uniformly towards each other, the distance between them decreases at the rate 50 m/s. If they move in same direction

with different speeds, the distance between them increases at the rate 10 m/s. The speed of two cars will be

A. 30 m/s and 20 m/s

B. 40 m/s and 10 m/s

C. 15 m/s and 35 m/s

D. 25 m/s and 25 m/s

**Answer: A**



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