PHYSICS

BOOKS - MCGROW HILL EDUCATION

PHYSICS (HINGLISH)

MOTION

Elementary Question

1. Unti of acceleration is

A. m/s

B. ms

C. $\frac{m}{s_2}$

D. none of these

Answer: C

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2. A body goes from A to b with a velocity of 20m/s and comes back from B to A with a

velocity of 30m/s. The average velocity of the body during he whole journey is

A. zero

B. 25m/s

C. 24m/s

D. none of these

Answer: A

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3. A body covers half the distance with a speed of 20m/s the other half with a speed of 30m/s. The average velocity ogf the body during the whole journey is

A. zero

B. 24m/s

C. (25 m/s

D. none of these

Answer: B

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4. In the equation of motion, `S=ut+1/2 at^(2), s stands for

A. distance in t seconds

B. maximum height reached

C. distance in the t^{th} second

D. none of these

Answer: A

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5. Choose the wrong statement

A. retardation is a vector quantity

B. accelaration due to gravity is a vector quantity

C. average speed is a vector quantity

D. displacement is a vector quantity

Answer: C

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6. In the euqation of motion, $x = at + bt^2$, the units of a and b are respectively

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

B. $\frac{m}{s}, \frac{m}{s^2}$

C. m/s, m/s

D. none of these

Answer: B

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7. A body is thrown up with an initial velocity u and covers a maximum hieght of h, then h is equal to

A. $\frac{u^2}{2g}$

B. $\frac{u}{2g}$

C. 2 ug

D. none of these

Answer: A

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8. The speed's hand of a which is 2cm long. The speed of the tip of this hand is

A. 0.21cm/s

B. 2.1 cm/s

C. 21.0 cm/s

D. none of these

Answer: A

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9. A body is thrown vertically upwards and rises to a height of 10m. The velocity with which the body was thrown is (g - 9.8m/(s^2)

A. 10m/s

B. 20m/s

C. 14m/s

D. none of these

Answer: C

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10. In question number nine the time taken by the bady to reach the highest point is

A. 1.43 s

B. 4.1 s

C. 1.24 s

D. none of these

Answer: A

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11. If the time-displacement graph of a particle is parallel to the-axis, the velocity of the particle is

A. infinity

B. unity

C. equal to accleration of the body

D. zero

Answer: D

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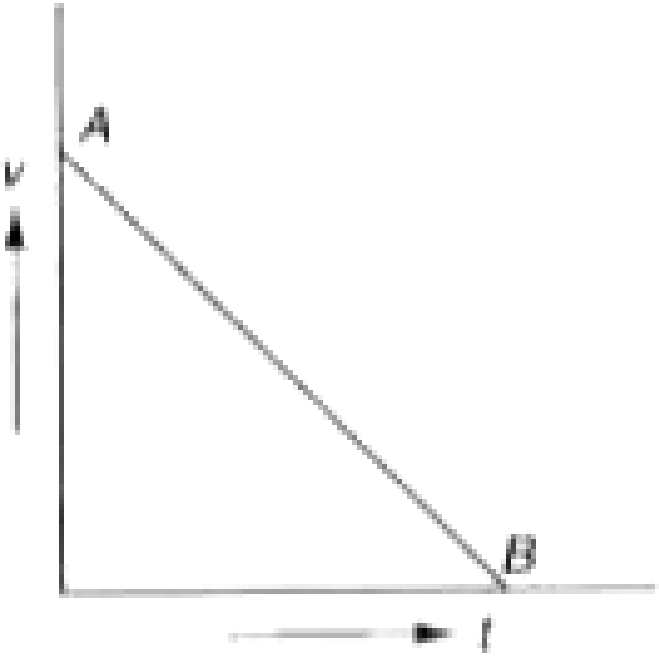
12. Velocity-time graph AB (Fig.) shows that the body has



A. a uniform accleration

B. a non-uniform retardtion

C. uniform speed

D. initial velocity OA and is moving with uniform retardation

Answer: D

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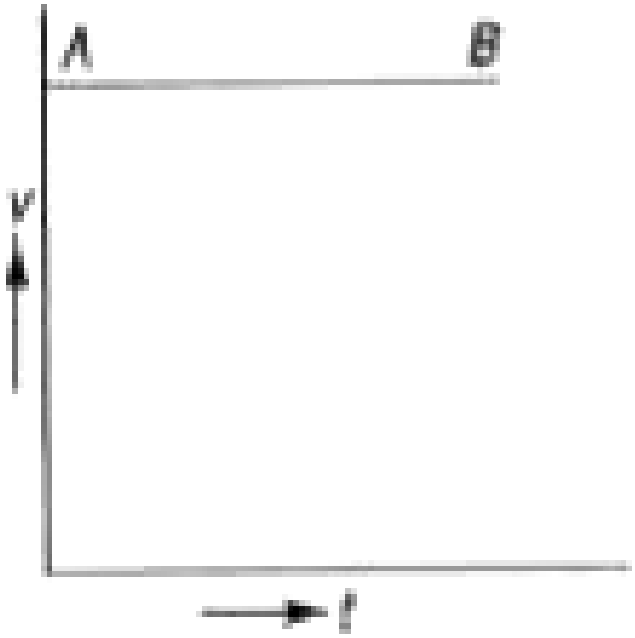
13. Velocity-time graph AB (Fig. 2.2) show that the body has



A. uniform acceleration

B. unifoprm retardation

C. uniform velocity throughout its motion and has zero initial velocity

D. none of these

Answer: D

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14. The distance travelled by a freely falling body is propotional to

A. the mass of the body

B. the square of the acceleration due to gravity

C. the square of the time of fall

D. the time of fall

Answer: C

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15. The rate of change of displacement with time is

A. speed

B. accerelation

C. retardation

D. velocity

Answer: D

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16. A body strikes the floor vertically with a velocity u and rebounds at the same speed. The change inspeed would be

A. uniform acceleration

B. 3u

C. 2u

D. zero

Answer: D

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17. The moon is $4 \times 10^8 m$ from the earth. A radar signal transmitted from the earth will reach the moon in about

A. 5.2 s

B. 1.3 s

C. 2.6 s

D. 0.70 s

Answer: B

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18. A and B are arguing about uniform accerelation. A states that accelarton means "the linger you gop." B states that accerelaton means " the further you go." Who is right?

A. A

B. B

C. Both

D. None

Answer: C

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19. A particle experiences constant acceleration for 20 s after starting from rest. If it travels a distance X_1, in the first 10 s and

distance X_2, in the remaining 10s, then which of the following is true?

A. $X_1 = 2X_2$

B. $(X_1 = X_2$

C. $X_1 = 3X_2$

D. None of these

Answer: D

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20. If a trolley starts from rest with an accerelaton of $2\frac{m}{s^2}$, the velocity of the body after 4 s would be

A. 2m/s

B. 8m/s

C. 4m/s

D. 6m/s

Answer: B

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21. A train passes over a 400m long bridge. If the speed of the traIN IS 30M/S and the train takes 20 s to cross the brigde , then the length of the train is

A. 400 m

B. 600 m

C. 800 m

D. 200 m

Answer: D

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22. the Si unit for the average velocity is

A. m/s

B. km/s

C. cm/s

D. mm/s

Answer: A

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23. The SI unit for the resultant velocity is

A. m/s

B. km/s

C. cm/s

D. min/s

Answer: A

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24. A train 50m long passes over a bridge at a velocity of 30 km/m. If it takes 36 s to cross the bridge, the length of the bridge will be

A. 100 m

B. 200m

C. 250m

D. 300m

Answer: C

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25. The SI unit for angular velocity is

A. m/s

B. rad

C. rad/s

D. m/rad

Answer: C

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26. N kg^{-1} is the unit of

A. retardation

B. acceleration

C. rate of change of velocity

D. all the above

Answer: D

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27. A ball is thrown up with certain velocity. It attains a height of 40 m and comes back to the thrower . Then the

A. total distance covered by it is 40m

B. total displacement covered by it is 80 m

C. total displacement is zero

D. total distance covered by it is zero

Answer: C

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28. The acceleration of a body projected upwards with a certain velocity is

A. $9.8\ \frac{m}{s^2}$

B. $-9.8\frac{m}{s^2}$

C. zero

D. insufficient data

Answer: B

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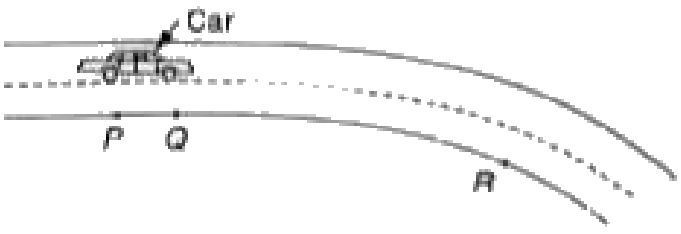
29. A driver is driving his car along a road as shown in Fig. 2.3. The driver makes sure that the speedometer reads exactly 40km/h. What happens to the speed of the car from P to Q?



A. Speed remains constant

B. Speed first increases then decreases

C. Speed first decreases then increases

D. Nothing can be decided

Answer: A

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30. In the above question, what happens to the velocity of the car from P to Q?

A. velocity remains constant

B. Velocity first increases then decreases

C. Velocity first decreases then increases

D. Nothing can be decided

Answer: A

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31. From Question 29, we can say that

A. the average speed is 40km/h

B. the average velocity is 40km/h

C. the average speed is 80km/h

D. the average velocity is 80km/h

Answer: A

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32. A stone tied to a string is whirled in a circle. As it is revolving, the rope suddenly breaks. Then

A. the stone flies off tangentially

B. the stone moves radially inward

C. the stone moves radially outward

D. the motion of the stone depends upon its velocity

Answer: A

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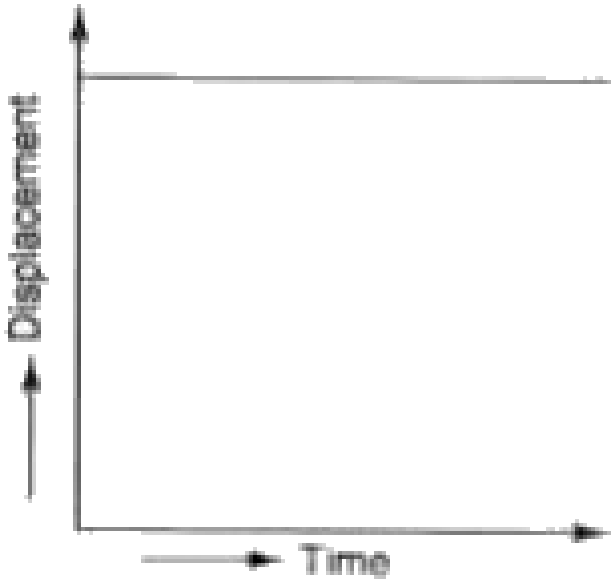
33. In the following graph (Fig. 2.4) of displacement versus time,



A. the body is at rest

B. the body has some initial speed

C. the body moves with sonstant speed

D. the body moves with constant velocity

Answer: A

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34. It follows from Question 34, that the velocity in case of (b) is

A. more than the velocity in case of (a)

B. less than the velocity in case of (a)

C. equal to the velocity in case of (a)

D. square of the velocity in case of (a)

Answer: B

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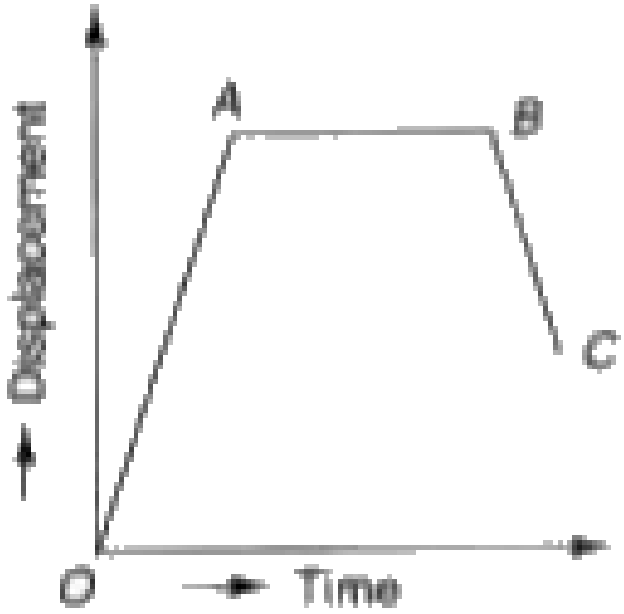
35. In Fig. 2.6, BC represents a body moving



A. backward with uniform velocity

B. forward with uniform velocity

C. backward with non-uniform velocity

D. forward with non-uniform velocity

Answer: A

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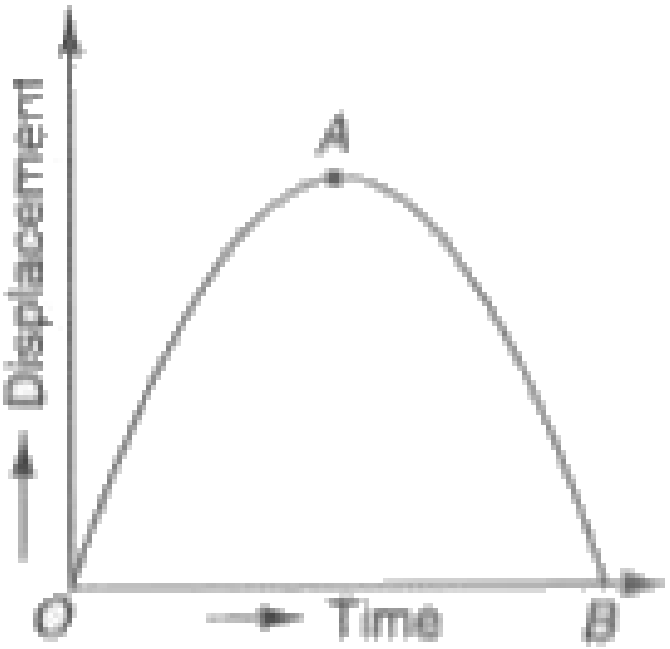
36. In Fig. 2.7, the velocity of the body at A is



A. zero

B. unity

C. maximum

D. infinite

Answer: A

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37. In the above question, the velocity

A. increases between points O and A

B. increases between points A and B

C. decreases between points A and B

D. is zero throughout

Answer: B

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38. A body moving along a circular path has

A. a constant speed

B. a constant velocity

C. no tangential velocity

D. no radial acceleration

Answer: A

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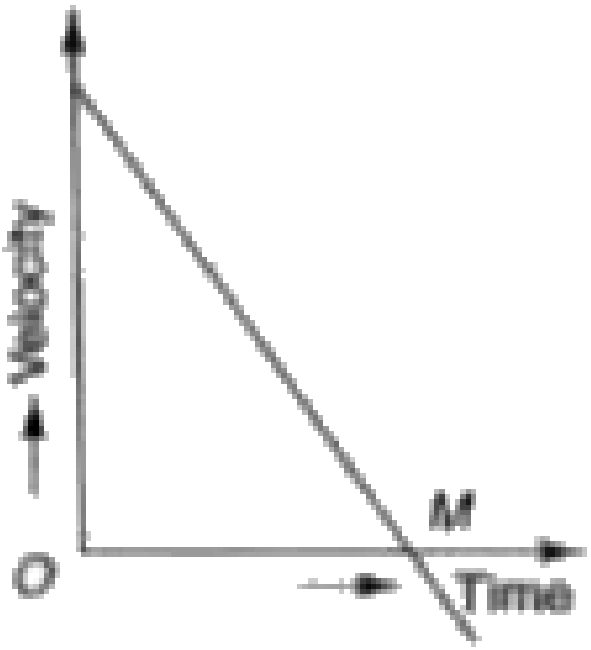
39. In Fig. 2.8



A. retardation is uniform

B. velocity is decreasing with time

C. beyond M, the body has negative velocity

D. all the above are incorrect

Answer: D

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40. A body whose speed in a particular direction is constant

A. must be accelerating

B. must be retarding

C. has a constant velocity

D. all the above

Answer: C

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41. The velocity of a particle increases from u to v in a time t during which it covers a distances S. If the particle has a uniform

accerelation, which one of the following equations does not apply to the motion?

A. 2S=(v+u)t

B. $a = \frac{v - u}{t}$

C. $v^2 = u^2 - 2aS$

D. $S = \left(u + \frac{1}{2}at\right)t$

Answer: C

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42. A body has an acceleration of $-4ms^{-2}$.

What is its retardation?

A. $-4ms^{2}$

B. $4ms^{-2}$

C. Zero

D. nothing can be decided

Answer: B

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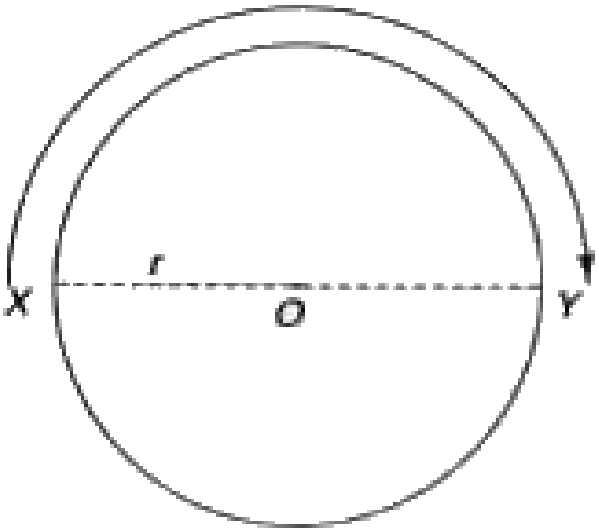
43. A cyclist moves from a certain point X and goes round a circle of radius 'r' and reaches Y, exactly at the other side of the point X, as shown in Fig. 2.9. The displacement of the cyclist would be



A. πr

B. $2\pi r$

C. $2r$

D. $2\frac{\pi}{r}$

Answer: C

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44. In the above problem, the distance covered by the cyclist would be

A. πr

B. $2\pi r$

C. 2r

D. $2\frac{\pi}{r}$

Answer: A

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45. Which of the following relations represents the relationship between the average speed, time and distance correctly?

A. $Avera \geq speed = dis\tan ce \times time$

B. $\text{Average speed} = \dfrac{\text{total distance}}{\text{total time}}$

C. Time = average speed + distance

D. Distance = average speed-time

Answer: B

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46. When a graph between two physical quantities is a straight line, the two quantities are:

A. both constant

B. independent of each other

C. directly proportional

D. inversely proportional

Answer: C

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47. A man walks 8 m towards East and then 6 m towards North. His magnitude of displacement is

A. 10 m

B. 14 m

C. 2 m

D. zero

Answer: A

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48. Area under a velocity-time graph gives

A. the time taken by a moving object

B. the distance travelled by a moving object

C. the acceleration of moving object

D. the retardation of a moving object

Answer: B

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49. A player completes a circular path of radius r in 40 s. At the end of 2 minutes 20 seconds, displacement will be

A. 2r

B. $2\pi r$

C. $7\pi r$

D. zero

Answer: A

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50. Which of the following physical quantities is different from others?

A. Speed

B. Distance

C. Energy

D. Average velocity

Answer: D

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51. Which of the following physical quatities is different from others?

A. Displacement

B. Velocity

C. Force

D. Kinetic energy

Answer: D

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52. The speed of a body describing its motion is

A. direction

B. state

C. type

D. rapidity

Answer: D

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53. The unit for the rate of change of velocity will be

A. m/s

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

C. Ns

D. N/s

Answer: B

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54. The velocity -time graph for a body with non-uniform motion is a

A. straight line

B. straight line parallel to x-axis

C. straight line parallel to y-axis

D. curved line

Answer: D

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55. The ratio of SI units to CGS units of retardation is

A. 10^{-2}

B. 10^{2}

C. 10

D. 10^{-1}

Answer: B

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56. The physical quantity corresponding to the rate of change of displacement is

A. speed

B. velocity

C. acceleration

D. retardation

Answer: B

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57. The velocity of a body at rest is always

A. unity

B. negative

C. zero

D. infinite

Answer: C

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58. When the distance an object travels is directly proportional to the length of time , it is said to travel with

A. zero velocity

B. constant speed

C. constant acceleration

D. uniform velocity

Answer: B

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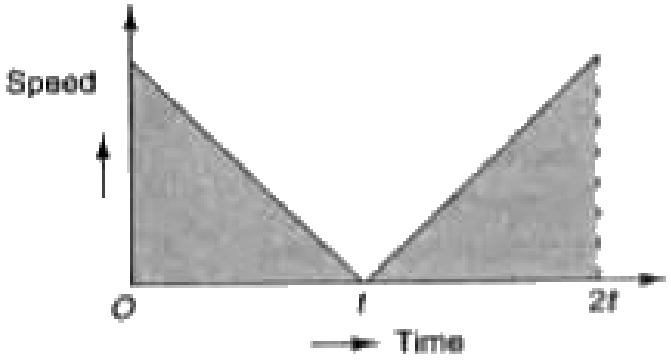
59. In the following speed-time graph (Fig. 2.10), the shaded portion gives



A. distance travelled

B. average speed

C. average velocity

D. displacement travelled

Answer: A

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60. A car increases its speed form 20km/h to 50km/h in 10 seconds. Its acceleration is

A. $30ms^{-2}$

B. $3ms^{-2}$

C. $18ms^{-2}$

D. none of these

Answer: D

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61. If the velocity of a body does not change with time, its acceleraton is

A. zero

B. infinite

C. unity

D. none of these

Answer: A

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Higher Order Thinking Questions

1. The location of a particle has changed. What can you say about the displacement and the distance covered by the particle?

A. One may be zero

B. Both may be zero

C. Neither can be zero

D. One is positive, other is negative and vice versa

Answer: C

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2. A train 120m long is going towards north direction at a speed of $8ms^{-1}$. A parrot flies at the speed of $4ms^{-1}$ towards south direction parallel to the railway track. The time taken by the parrot to cross the train is

A. 30 s

B. 15 s

C. 10 s

D. 5 s

Answer: C

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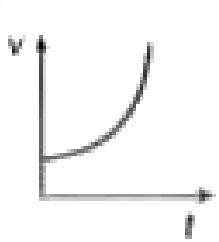
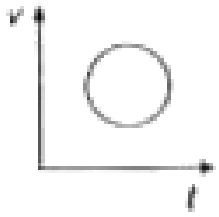
3. Which of the following velocity-time graphs does not represent motion in one dimension?

A.

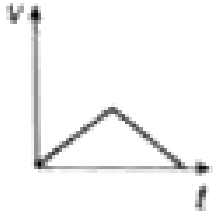


B.



C.

D.



Answer: B

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4. A boy completes one round of a circular track of radius r in 40 s. His displacement at the end of 2min 20s will be

A. zero

B. 2r

C. $2\pi r$

D. $7\pi r$

Answer: B

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5. A particle starts from the origin, goes along X-axis to the point (30m, 0) and then returns along the same line to the point (-30m,0). The displacement and distance of the particle during the trip are

A. 0, 60m

B. 60m,30m

C. 90m, -30m

D. $-30m, 90m$

Answer: D

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6. A car runs on a circular track at a constant speed. The circular track has a radius of 100m. If the car takes 62.8 on each lap, its average speed is

A. $20ms^{-1}$

B. $10ms^{-1}$

C. $5ms^{-1}$

D. zero

Answer: B

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7. In question 68 above, the average velocity of the car is

A. $10ms^{-1}$

B. $20ms^{-1}$

C. zero

D. $5ms^{-1}$

Answer: C

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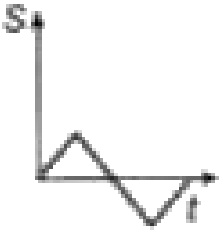
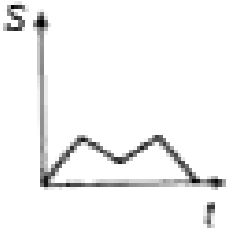
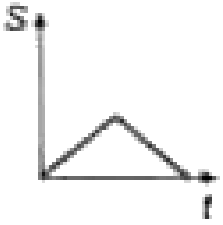
8. Which of the following distance-time graphs is not possible?

A.



B.

C. 

D. 

Answer: A

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9. Two persons start running towards each other from two points that arc 120m apart.

First person ruins with a speed of $5ms^{-1}$ and the other wi9th a speed of $7ms^{-1}$. Both the persons meet after

A. 10 s

B. 24 s

C. 1 min

D. 48 s

Answer: A

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10. In question 71 above, two persons meet each other from the first point at

A. 70m

B. 80m

C. 50m

D. 12m

Answer: C

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11. If a car at rest accelerates uniformly to a speed of 144km/h 20 s, it covers a distance of

A. 400m

B. 1440m

C. 2880m

D. none of these

Answer: A

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12. 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. 40m

B. 36m

C. 100m

D. zero

Answer: B

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13. A 120 m long train is moving in a direction with a speed of $20ms^{-1}$. Another train (130m long) moving with $30ms^{-1}$ in the opposite directon crosses the first train in a time

A. 36 s

B. 30 s

C. 6 s

D. 5 s

Answer: D

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14. A bullet is fired with a speed of $10^3 ms^{-1}$ in order to hit s target 100m away. If $g = 10 ms^{-2}$, the gun should be aimed at

A. directly towards the target

B. 5 cm below the target

C. 5 cm above the target

D. 15 cm above the target

Answer: C

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15. A car moves for half of its time at $80km/h$ and for rest of time at $40km/h$. Total distance covered is $60km$. What is the average speed of the car

A. 120km/h

B. 100km/h

C. 80km/h

D. 60km/h

Answer: D

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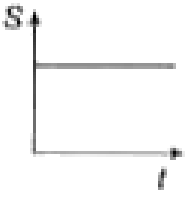
16. The distance (5) travelled varies with time (t) for four different-bodies as given below. In which case is the acceleration of the body is minimum?

A. 

B.

C.

D.

Answer: D

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17. The area under acceleration-time graph gives

A. distance travelled

B. the displacement

C. Velocity

D. change in velocity

Answer: D

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18. The displacement of a body is given to be proportional to the cube of time elapsed. The magnitude of the acceleration of the body is

A. decreasing with time

B. increasing with time

C. constant but not zero

D. zero

Answer: B

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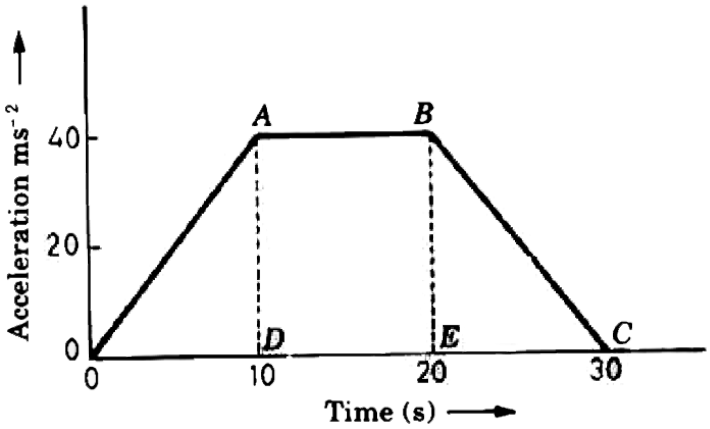
19. Fig. 3.39 shows the acceleration - time graph for a particle in rectilinear motion. Find the average acceleration in first 20 s.



A. $40ms^{-2}$

B. $30ms^{-2}$

C. $20ms^{-2}$

D. $15ms^{-2}$

Answer: D

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20. A body nis thrown vertically upward. Which of the following graphs correctly/represents the velocity of the body with time?

A. 

B. 

C. 

D. 

Answer: A

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21. A body of mass 3kg moving with a constant acceleration covers a distance of 10m in the 3rd second and lbm in the 4th ssecond respectively.

The initial velocity of the body is

A. $10ms^{-1}$

B. $8ms^{-1}$

C. $5ms^{-1}$

D. $-5ms^{-1}$

Answer: D

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22. A bus travelling the first-one-third distance at a speed of 10km/h, the next one-fourth at

20 km/h and the remaining at 40km/h. The average speed of the bus is about

A. 8km/h

B. 9km/h

C. 16km/h

D. 18km/h

Answer: D

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23. A stone is dropped from the top of a tower and travels 24.5 m in the last second of its journey.

Then the height of the tower is

A. 44.1 m

B. 49 m

C. 78.4 m

D. none of these

Answer: A

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24. A stone is dropped into a well in which the level of water is H metre below the top of the well. If v is velocity splash is heard will be given by

A. $\frac{2H}{V}$

B. $\sqrt{\frac{2H}{g}} + \frac{H}{V}$

C. $\sqrt{\frac{H}{2g}} + \frac{2H}{V}$

D. $\sqrt{\frac{2H}{V}} + \frac{H}{g}$

Answer: B

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25. Which of the following shows velocity (v) - time (t) graph for falling apple?

A. 

B. 

C. 

D. 

Answer: D

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26. A man throws ball into the air one after the other. Throwing one when other is at the highest point. How high the balls rise if he throws twice a second.

A. 0.49 m

B. 1.25 m

C. 2.45 m

D. 4.9 m

Answer: B

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27. A car moving with a speed of $30ms^{-1}$ takes a U-turn in 6 seconds, without changing its speed. What is the average acceleration during these 6 seconds?

A. $5ms^{-2}$

B. $10ms^{-2}$

C. $2.5ms^{-2}$

D. zero

Answer: B

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28. Tripling the speed of a motor car multiplies the distance required for stopping it by

A. 2

B. 3

C. 6

D. 9

Answer: D

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29. An insect craws a distance of 3m along north in 6 seconds and then a distance of 4 m along east in 9 seconds. Then the average velocity of the insect is

A. $3ms^{-1}$

B. $2ms^{-1}$

C. $\frac{17}{18}ms^{-1}$

D. $\frac{1}{3}ms^{-1}$

Answer: D

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30. In which of the following velocity (v) - time (t) graphs, the instantaneous acceleration decreases with time?

A. 

B. 

C. 

D. 

Answer: C

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31. If x is the distance at which a car can be stopped when initially it was moving with speed u, then on making the speed of the car

Nu, the distance at which the car can be stopped is

A. Nu

B. N^2u

C. $\frac{u}{N}$

D. $\frac{u}{N^2}$

Answer: B

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32. When $x \propto t^n$, acceleration is constant when n equals

A. greater than 2

B. less than zero

C. 2

D. nothing can be divided

Answer: C

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33. Distance covered-time graph cannot be

A. a closed curve

B. below the time-axis

C. a line or curve with negative slope

D. all of he above

Answer: D

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34. Area between the time-axis and v-t curve when added with proper algebraic sign is equal to magnitude of

A. distance

B. speed

C. displacement

D. instantaneous velocity

Answer: C

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35. An aeroplane moves $400m$ towards north, $300m$ towards west and then $1200m$ vertically upward. Then its displacement from the initial position is

A. 1.3 km

B. 1.4 km

C. 1.5 km

D. zero

Answer: A

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36. A cyclist moving on a circular track of radius 20m completes half a revolution in 20 seconds.

What is its average velocity?

A. zero

B. $2\pi ms^{-1}$

C. $2ms^{-1}$

D. $4\pi ms^{-1}$

Answer: C

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37. Acceleration (a) - time (t) graph of a body is given

Fig.2.21(a)

Which of the following graphs the corresponding veolcity (v) - time (t) variation?

A. 

B. 

C. 

D. 

Answer: B

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38. A car accelerates from rest at a constant rate α for sometime , after which it decelerates at a constant rate β and comes to

rest. If T is the total time elapsed, the maximum velocity acquired by the car is

A. $\left(\frac{\alpha\beta}{\alpha+\beta}\right)T$

B. $\left(\left(\alpha+\frac{\beta}{\alpha\beta}\right)T\right.$

C. $\left(\frac{\alpha^2+\beta^2}{\alpha\beta}\right)T$

D. $\frac{1}{2}\frac{\alpha T}{\beta}$

Answer: A

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39. A body falls from a height H. Its velocity (v)-distance (x) graph is

A. 

B. 

C. 

D. 

Answer: A

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40. A person sitting in a train moving with a constant velocity along a straight line throws a ball vertically upwards, then the ball will

A. full onwards the train

B. behind the thrower's hand

C. return to thrower's hand

D. nothing can be decided

Answer: C

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41. A body starting from rest moves with constant acceleration. The ratio of distance covered by the body during the 5th second to that covered in 5 seconds is

A. $\frac{1}{25}$

B. $\frac{3}{25}$

C. $\frac{9}{25}$

D. $\frac{1}{25}$

Answer: C

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42. A bullet loses $\frac{1}{20}$ of its velocity after penetrating a plank. How many planks are required to stop the bullet?

A. 9

B. 11

C. 7

D. 5

Answer: B

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43. Which of the following cannot be speed (v) - time (t) graph?

A. 

B. 

C. 

D. 

Answer: C

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44. Figure shows the displacement (x)-time (t) graph of particles A and B. Which of the following statements is correct?

Fig. 2.26 

A. A is accelerated B is restarted

B. A and B move with uniform equal speed

C. Both A and B move with uniform speeds but speed of A is more that that of B

D. Both A and B move with uniform speeds but speed if A is less than that of B

Answer: C

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45. Velocity (v) - time (t) graphis shown in figure What will be displacement of the body in 5 seconds?

Fig.2.27 

A. 2m

B. 3m

C. 4m

D. 6m

Answer: B

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46. If a body is realeased from the top of a tower, the graph between distance (x) and time (t) is correctly shown by

A. 

B. 

C. 

D. 

Answer: A

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47. A body is thrown vertically upwards. If air resistance is to be taken into account, then the time during which the body rises is.

A. equal to the time of fall

B. less than the velocity in case of (a)

C. greater than the time of fall

D. nothing can be decided

Answer: B

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48. A body freely falling from rest has a velocity V after it falls through a height H. The

distance it has to fall down further for its velocity to become double is

A. 3 H

B. 2 H

C. H

D. $\frac{H}{2}$

Answer: A

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