PHYSICS

BOOKS - PEARSON IIT JEE FOUNDATION

KINEMATICS

Fill In The Blanks

1. Two hour is equal to _____ seconds.

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2. The motion of moelecules in a solid is an example for _____ motion.

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3. One millisecond is _____part of a second.

4. A body moving with velocity of $10ms^{-1}$ increases its velocity to $20ms^{-1}$ in 2 s. then the rate of change in velocity is ___-

5. A car moves with a contant velocity m its average velocity is equal to its_____

6. The time period of a simple pendulum depends on its_____

7. A body moves with unifrom spedd of u ms^{-1} towards east , then the body is said to possess _____ velocity.

8. The time taken by the bob of a simple pendulum of time period (T) to move from one exrtreme positon to other extreme position is equal to _____

Mcq

1. Choose the corredct statement :

    A. the magnitudes of speed and velocity are same when a body travels in a stright line path.

B. Average speed ofa moving body can be equal to zero, but its average velocity cannot be equal to zero.

C. To describe the velocity , direction is necessary.

D. Both (A) and ©

Answer: D

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2. The ratiro of unit of accceleration and velocity gives unit of the physical quantity _____

A. time

B. frequency

C. amplitude

D. speed

Answer: B

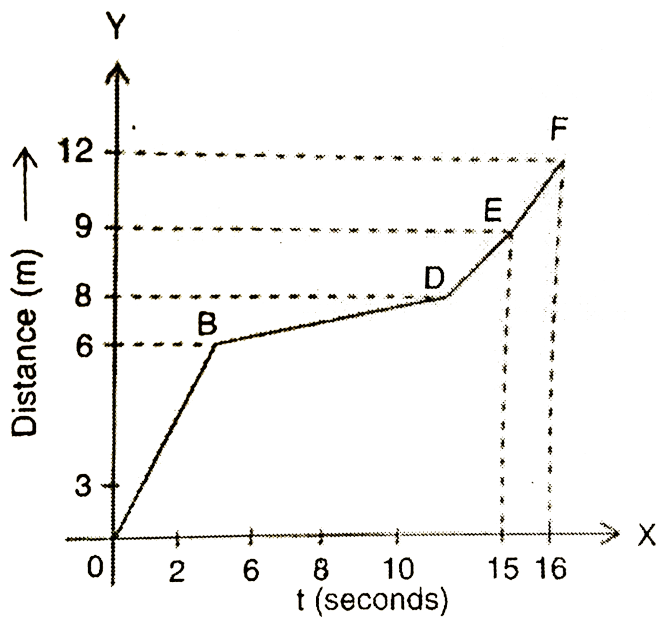**3.** Unit of speed is ____

A. $m \ \min^{-1}$

B. kmh^{-1}

C. $kms(-1)$

D. All the above

Answer: D

4. The motion of a body is depicted graphically as shown in the figure, then the average speed of the body is ____ ms^{-1}.

A. $\dfrac{3}{4}$

B. $\dfrac{9}{8}$

C. $\dfrac{4}{3}$

D. $\dfrac{8}{9}$

Answer: B

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5. The speed of the tip of a second hand of length 5 cm of a clock is ____ ms^{-1}

    A. 1

    B. 60

    C. 5.3×10^{-3}

    D. 3.4×10^{-5}

Answer: C

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6. The time period of a pendulum is independent of _____

    A. length of the pendulum

    B. mass of the bob

    C. shape of the bob

    D. both (b) and ©

Answer: D

7. the distance between two stations is 20 km. if a train moves with a constant speed of $60 kmh^{-1}$, then the time taken by the train moves with a constant speed of $60 kmh^{-1}$, then the time taken by the rain to reach the next station is ____

A. 2 hour

B. 20 min

C. 20 sec

D. 40 min

Answer: B

8. The distance -time graph of an object is a straight line parallel to the time axis , then the object is ____.

    A. at rest

    B. in uniform motion

    C. moving with a unifrom speed

    D. moving with a non-uniform speed

Answer: A

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9. A car moves with a speed of $60kmh^{-1}$ for 20 min and then at a speed of $30kmh^{-1}$ for the next 20 min. the total distance covered by the car is ____ km.
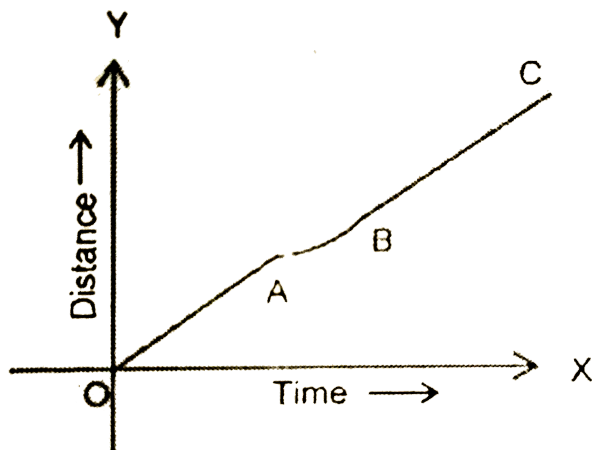
    A. 10

    B. 20

C. 30

D. 40

Answer: C

10. The distance- time graph of a body is as shown in the figure. The part of the graph that represent the unifrom speed of the body is

A. OA

B. AB

C. BC

D. Both OA and BC

Answer: D

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11. A body moves with a unifrom speed of $10 kmh^{-1}$ for 2h. The average speed of the body is _____ km h^{-1}

A. 10

B. 20

C. 5

D. 25

Answer: A

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12. write SI and CGS unit of any three physical quantities?

13. $1 kmh^{-1} = \_\ \_\_\ \_\ ms^{-1}$

A. $\dfrac{50}{3}$

B. $\dfrac{5}{18}$

C. $\dfrac{18}{5}$

D. $\dfrac{5}{8}$

Answer: B

14. Choose the corrct statements (s)
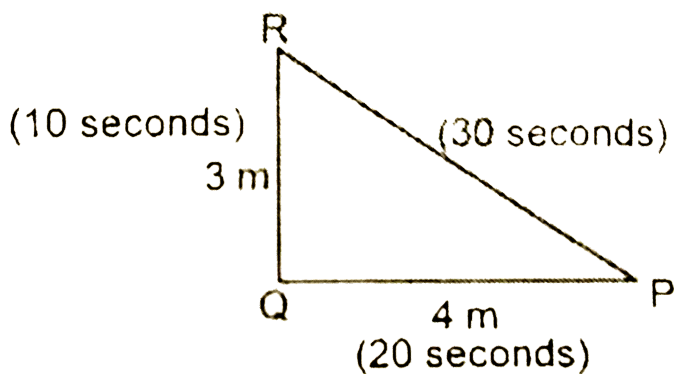
A. speed and velocity both have same units.

B. if a body has a speed of $50ms^{-1}$ in a striaght line path , then its velocity is 180 km h^(-1)`

C. speed ofa vehicle is measured by a device called speedometer.

D. All the above

Answer: D

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15. A person starts from a point P and travels along a path PQRS as shown in the figure, then speed of the person is ____ ms^{-1}

A. 0.2

B. 20

C. 12

D. 0.4

Answer: A

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16. A simple pendulum was given to a physics student to determine its time period. Arrange the following steps in sequential order to determine its time period.

(A). Calculate the radius of the bob 'R' by divding the diameter by 2.

(B) Take a metre scale and measure the length of the string from the point of suspension to the lower tip of the bob (l_1)

(C). Place the bob over a meter scale and hold it in postion with two wooden blocks of stiff cadboards. Measure the diamter (D)of the bob.

(D). NOW, the length of the pendulum (l) is given by $(l_1 - R)$

E. Consider the formula $T = 2\pi . \sqrt{\dfrac{l}{g}}$ calculate.

The time period of the simple pendulum.

  A. ABCDE

  B. EDCBA

  C. BCCADE

  D. DEABC

Answer: C

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17. A body cover 20 m in 2 s and another 20 m in next 4s. Arrange the following steps in sequential order to find th average velocity of the body .

(A) Find the displacements of the body in first 2s and next 4 s from the given data.

(B) find the displacements of the body .

(C) find the total time taken by the body to complete the total displacement .

(D) Use the formula, average velocity $= \dfrac{\text{total displacement}}{\text{Total time taken}}$
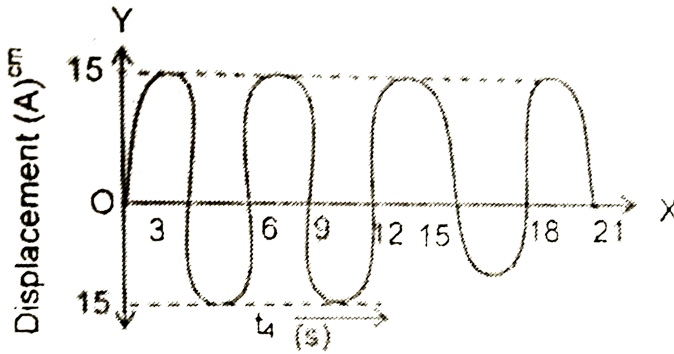
A. ABCD

B. ADCB

C. DCBA

D. DBCA

Answer: A

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18. In the case of a simple pedulum a fraoh is drawn between th displacement and time taken for its oscillations as shown in the figure then.

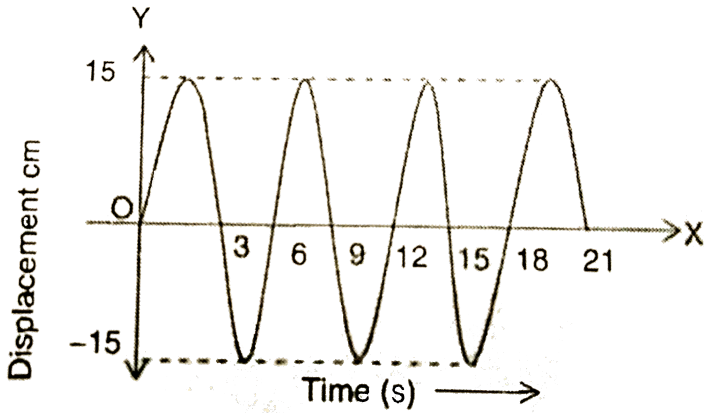Time period of the pendulum bob is _____

A. 9

B. 6

C. 4.5

D. 3

Answer: B

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19. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure .

Then

The number of oscillations completed by the bob in one second is _____ .

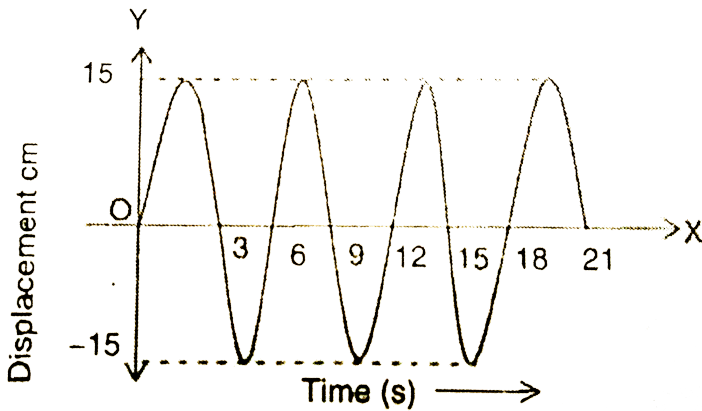
A. $1/3$

B. $1/3$

C. $1/9$

D. 1

Answer: A

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20. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure . Then

The amplitude of oscillation of the pendulum of the bob is ____ cm .
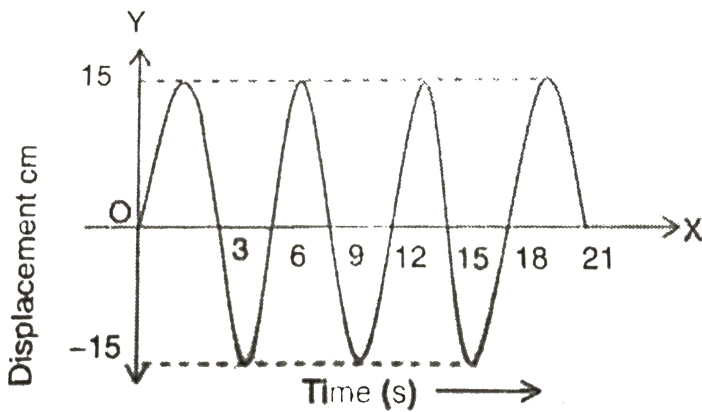

A. 15

B. 5

C. 2.5

D. 7.5

Answer: A

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21. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure . Then

From the given figure, the number of oscillation performed by the bob at the end of 21 s is _____

A. 3

B. 4

C. 2

D. $3^{1/2}$

Answer: D

22. Choose the correct statement :

A. Every oscillatory motion is periodic in nature.

B. Every periodic motion is oscillatory in nature.

C. The motion of a pendulum bob is periodic in nature (within its small amplitude)

D. Both (a) and (c)

Answer: D

23. Choose the correct statement

A. Unit of acceleration is ms^{-2}

B. Speed = distance/ time .

C. Magnitude of displacement made by a body is less than or equal to the distance travelled by the body.

D. All the above

Answer: D

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24. what is uniform motion ?

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25. Assertion: A body having non zero acceleration can have a constant velocity.

Reason: Acceleration is the rate of change of velocity.

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true, but R is not the correct explanation of A.

C. A is true but R is false

D. Both A and R are false.

Answer: A

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26. The time period of a simple pendulum is 4 s and the acceleration due to gravity at the given place is $9.8ms^{-2}$. Write the following steps in sequential order to find the length of the pendulum.

(A) From the above formula, write the value of l and $l = \dfrac{T^2 \cdot g}{4\pi^2}$

(B) Note the given values of the time period (T) and acceleration due to gravity (g).

(C)Write the formula, $T = 2\pi\sqrt{\dfrac{l}{g}}$, where l is the length of the pendulum.

(D). Substitute the given data and get the value of l.

A. CDBA

B. ABCD

C. BCAD

D. ADBC

Answer: C

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27. A car starts from and attains a velocity of 54 km h^{-1} if the acceleration of the car is from rest and attains a velcoity of 54 km h^{-1}. If the acceleration of the car is $3ms^{-2}$, write the following steps in sequential order to find the time taken to accelerate the car.

(A) Write the relation between u,v,a and t, where t is the time taken to accelerae the car.

(B) Note the final velocity (v) and convert it into SI unit.

(D) substitute the given values and obtain the vlaue of t using $t = \dfrac{v - u}{a}$
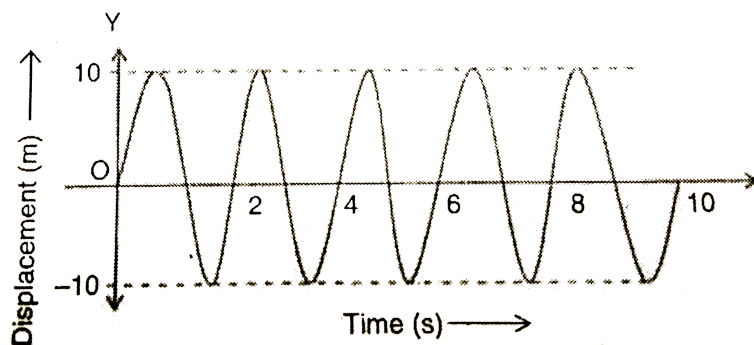
A. ABCD

B. ABCD

C. CADB

D. CBAD

Answer: d

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28. A graph is drawn between the displacement and time taken for the oscillations of a simple pendulum.

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29. The number of ocscillations performed by the bob at the end of 10 s

is_____

A. $4^{1/2}$

B. 5

C. 6

D. $12^{1/2}$

Answer: B

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30. A graph is drawn between the displacement and time taken for the oscillations of a simple pendulum is 2s. The length of the penddulum is

_____ m (if g = 10 s^{-2} and $\pi^2 = 10$)

A. 2

B. 1

C. 0.5

D. 0.25

Answer: B

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31. The frequency of oscillation is _____Hz.

A. 0.5

B. 2

C. 50

D. 100

Answer: A

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32. An electric motor winds 200 turns of a thin coper wire on a unifrom of diameter 10 cm, in 2 seconds.then the length of the wire that is wound over the rod in one second is _____ m.
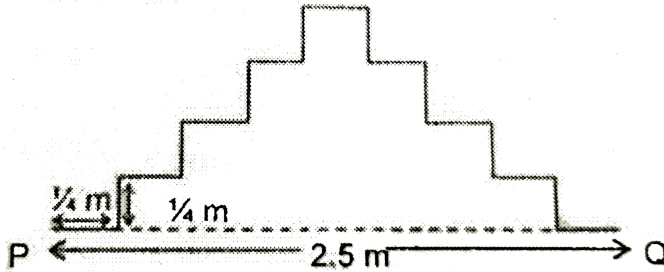
A. 30

B. 10π

C. 20π

D. none of these

Answer: B

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33. An ant moves along the identical steps from P to Q as shown in the figure in a figure in a duration of 8.5 seonds. Then the speed and velocity

of the ant respectively are _____ m s^{-1} and _ _ _ ms^{-1}

_____ m s^{-1} and _____ m s^{-1}

A. 0.5, $\dfrac{4.5}{14}$

B. 0.5,0.5

C. $\dfrac{5}{17}, \dfrac{4.5}{17}$

D. Cannot be determined

Answer: A

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34. If $T = 2\pi\sqrt{\dfrac{l}{g}}$ is the time period of a simple pendulu, then the unit of

$4\pi^2 \dfrac{l}{T^2}$ in the SI system is _____ .
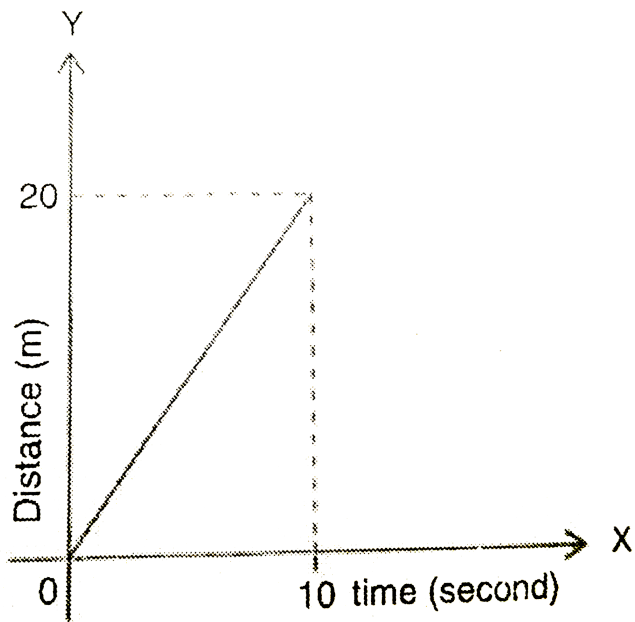
A. ms^{-1}

B. s^{-2}

C. ms^{-2}

D. s^{-1}

Answer: C

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35. The motion of a body is depicted graphically as shown in the given figure. Then the average speed of the body is _____ m^{-1}

A. 2

B. zero

C. 200

D. 20

Answer: A

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36. A vechicle travels along a straight path between two places α and β. It travels first half of the distance with a velocity of 72 km h^{-1} and the remaining distance with a velocity of 36 km h^{-1} then the average velocity of the vehicle is _____ ms^{-1}

A. 11.3

B. 13.3

C. 15

D. 14

Answer: B

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37.

Column A	ColumnB
(A) A body covers 5 m in every subsequent second	(a) Lunar month
(B) Equal distances in unequal intervals of time	(b) Non-uniform speed
(C) Periodic motion of the moon around the earth	(c) Years
(D) Approprite unit to express the age of a person	(d) Constant speed

A. $A \rightarrow b, B \rightarrow c, C \rightarrow d, D \rightarrow a$

B. $A \rightarrow d, B \rightarrow b, C \rightarrow a, D \rightarrow c$

C. $A \rightarrow d, B \rightarrow a, C \rightarrow b, D \rightarrow c$

D. $A \rightarrow a, B \rightarrow b, C \rightarrow c, D \rightarrow d$

Answer: B

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Match

1.

ColumnA

ColumnB

A. Periodic motion a. maximum displacement of vibrating particle from

B. Vibrtory motion b. The pistion of a motor car engine at uniform car en

C. Body at rest c. Non- uniform motion

D. Amplitude $d.18/5 kmh^{-1}$

E. Variable speed e. OScillating objects undergo change in shape of size

F. $1ms^{-1}$ f. $\frac{\text{Total displacement}}{\text{Total time}}$

G. Average velocity g. Zero velocity

2.

ColumnA

ColumnB

A. Curbulinear motion a. motion that repeats itself irreg

B. Rectilnear motion b. Wings of a ceiling fan

C. Rotatory motion c. A stone dropped from a towar

D. Body moving with uniform velocity d. A stone dropped from a towar

E. Length of a pendulum e. point of supendsion to the mid-

F. Time period of a simple pendulum f. Square root of the length of the

G. Non-periodic motion g. Zero acceleration

3.

Column A	Column B
A. cicular motion	*a.* Vechicle cro
B. Rectilinear motion	*b.* One to-and-
C. Curvilinear motion	*c.* Distance-tin
D. $\frac{v-u}{a}$	*d.*100cm
E. Constant speed	*e.* Time (t)
F. Oscillation	*f.* A spinning t
G. The length of a seconds pendulum $\left(\text{taking} g = 10ms^{-2}\right)$	*g.* Coin moving

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Level 1

1. One hour is equal to 360 second.

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2. The motion of a simple pendulum is an example of oscillatory motion. ?

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3. A nanosecond is one billionth of a second.

4. When an object is moving with a unifrom speed, its average speed is equal to its speed

5. We can use a simple pendulum to measure the time.

6. By using distance-time graph we can find out the average speed of an object.

7. Speedoneter is used to measuere the distance travelled by a vehicle.

8. The distance-time graph of the motion of an object moving with a contant speed is a straight line.

9. _____ measures the distance moved by a vehicle.

10. A body is said to be moving with unifrom speed if it covers equal distance in _____

11. One microsecond is_____ of a second.

12. SI unit of speed is _____

13. One Kilometer is equal to _____ metre.

14. The time taken by the pendulum to complete one oscillation is called_____

15. The distance coverd by an object in a unit time is known as the _____ of the object.

16. An object moving along a straight line with a constant speed is said to be in ____

17. the velocity of the bob of a simple pendulum is minimum at ____

18. The time period of a simple pendulum of length 1 m is ____ second. (take $\pi^2 = 10$. $g = 10ms^{-2}$)

1. Choose the correct statement:

A. Every osillatory motion is periodic in nature.

B. Every periodic motion is oscillatory in nature.

C. The motion of a pendulum bob is periodic in nature (within its

small amplitude)

D. Both (a) and (c)

Answer: D

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2. If $T = 2\pi\sqrt{\dfrac{l}{g}}$ is the time period of a simple pendulu, then the unit of

$4\pi^2 \dfrac{l}{T^2}$ in the SI system is _____ .

A. ms^{-1}

B. s^{-2}

C. ms^{-2}

D. s^{-1}

Answer: C

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3. Can the speed of a body be begative ?
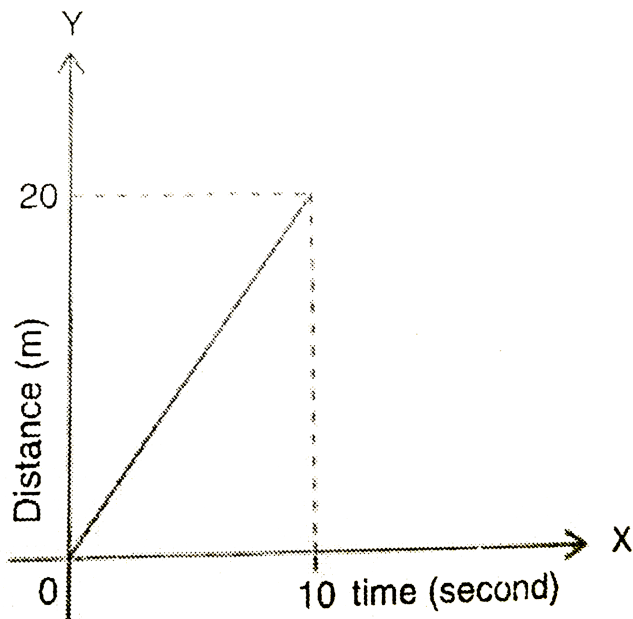
A. positive

B. negative

C. zero

D. Both (a) and (b)

Answer: B

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4. The motion of a body is depicted graphically as shown in the given figure. Then the average speed of the body is _____ m^{-1}

A. The average speed of the body is $2ms^{-1}$

B. the average speed of the body is zero.

C. the body changes its direction twice.

D. All the above

Answer: A

5. A body travels 10 m in 2s then the speed of the body is _____ ms^{-1}.

A. 20

B. 40

C. 5

D. 10

Answer: C

6. A body moves with a speed of $2\pi ms^{-1}$ in a cirular path of radius 1 m , then the time taken to compete one revolution is _____.

A. 1

B. 2

C. 3

D. 4

Answer: A

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7. The odometer of a bus reads 6700 klm when it starts from the station at 9.m. and when it comes back to the sation at 10 p.m. the odometer reading is found to be 6960 km, then the average speed of the bus in the would journey is ____kmh^{-1}

A. 10

B. 20

C. 30

D. 40

Answer: B

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8. A pendulum completers 120 oscillations hin one minute then the time period of the pendulum is _____ s.

A. 0.5

B. 120

C. 2

D. 3

Answer: A

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9. A body moves with a contant speed of $10ms^{-1}$ for 1 hour. The distance travelled by the body is _____

A. 36,000 km

B. 36 km

C. 24 km

D. $24 \times 10^3 m$

Answer: B

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10. It takes 1 s for the bob to moves from one extreme position to other extreme postion. Then the time period of the pendulum is _____ s.
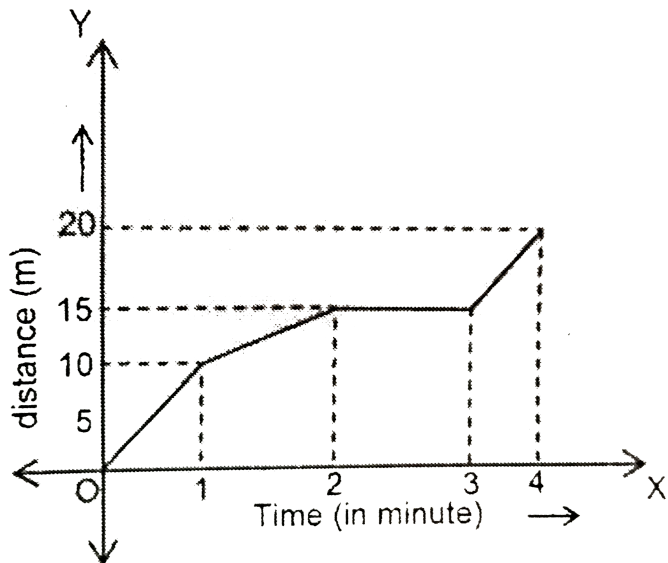
A. 1

B. 2h

C. 3

D. 4

Answer: B

11. A body projected upwards from the top of a builing is an example of _____

    A. uniform motion

    B. non-uniform motion

    C. periodic motion

    D. oscillatory motion

Answer: B

12. Distance versus time graph of an object is as shown in the figure. The average speed of the object is _____ ms^{-1}

A. 0.08

B. 0.5

C. 1

D. 2

Answer: A

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13. $20ms^{-1}$ __ __ kmh^{-1}

A. 12.5

B. 72

C. 50/9

D. 32

Answer: B

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14. Choose the correct statement:

A. Unit of acceleration is ms^{-2}

B. Speed = distance/ time .

C. if a body moves with unifrom elocity, its acceleration is zero.

D. All the above

Answer: D

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15. A car drive accelerates the car to increase its speed from 30 km h^{-1} to $60kmh^{-1}$ in 5 min. Arrage the following steps a sequence to obtain the acceleration of the car.

(A) Use the formula , rate of change of velocity $=$ $$\frac{\text{Total change in veclocity}}{\text{Total time required for change}}$$

(B) Obtain the final velocity (v) , of the car.

(C) Find the time taken to increase the speed of the car from u to v let it be 't'

(D) find the initial velocity (u) of the car.

(E) Substitute the values in the formula and calulate the acceleration of the car.

   A. EABCD

   B. ABCDE

   C. DBCAE

   D. EDCBA

Answer: C

16. Find the acceleration due to gravity on the surface of the moon by taking a seconds pendulum from the earth's surface. Arrange the following steps in sequential order to solvbe the above problem.

(A) Find the time period of this simple pendulum on the surface of the moon using a stop clock $[T_M]$

(B) The acceleration due to gravity on the moon (gm) is 1/6th the accleration due to gravity on the earth (ge).

(C) Use the formula , $T = 2\pi\sqrt{\dfrac{l}{g}}$

(D) first , take pendulum to the surface of the moon without altering the length of the pendulum (l), .

(E) Substibe the value of T_M in (a), then $\dfrac{T_E}{T_M}\sqrt{\dfrac{g_M}{g_E}}$, and obtain the value of (g_m)

   A. ABCDE

B. DACEB

C. CBADE

D. CABED

Answer: B

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17. The frequency of oscillation of seconds pendulum is _____ HZ.

A. 0.5

B. 2h

C. 50

D. 100

Answer: A

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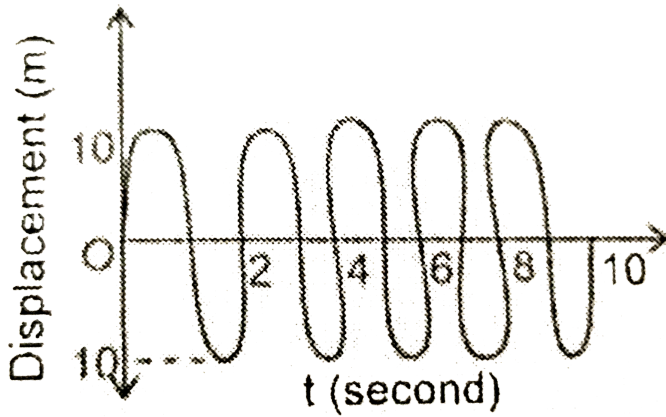**18.** The number of ocscillations performed by the bob at the end of 10 s

is_____

A. $4^{1/2}$

B. 5

C. 6

D. $2^{1/2}$

Answer: B

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19. The time taken to complete 100 oscillations is _____ s.

A. 100

B. 200

C. 50

D. 25

Answer: B

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Level 1 Macth

1.

Column A	ColumnB
$A.$ Vibratory motion	$a.$ Distance-time graph is not a straight line
$B.$ Rotatory motion	$b.$ speed $\times$ time
$C.$ seconds travelled	$c.$ musical instruments
$D.$ Distance travelled	$d.$ the rate of change of motion in specific direction
$E.$ Variable speed	$e.$ Potter'swheel
$F.$ Velocity	$f.2s$

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2.

Column A	ColumnB
$A.$ Speed	$a.$ Uniform motion
$B.$ Time	$b.$ Non-uniform motion
$C.$ Average speed	$c.$ km h^{-1}
$D.$ Uniform speed in a straight line	$d.$ second
$E.$ Freely falling body	$e.$ Change in time period
$F.$ Change in length of a pendulum	$f.$ $\frac{\text{Total distance}}{\text{Total time}}$

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3.

Column A	ColumnB
A. Non- uniform motion	a. To measure speed of the vehicle
B. Oscillatory motion	b. Uniform motion
C. Mean position	c. A criket ball that rolls over ground
D. Speedometer	d. The needle of sewing machine that moves up an
E. Constant speed	e. Freely suspended pendulum at rest
F. Acceleration	f. $\dfrac{\text{Total change in velocity}}{\text{Total time taken for change}}$

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Level 2 Mcq

1. A vechicle travels along a straight path between two places α and β. It travels first half of the distance with a velocity of 72 km h^{-1} and the remaining distance with a velocity of 36 km h^{-1} then the average velocity of the vehicle is _____ ms^{-1}

A. 11.3

B. 13.3

C. 15

D. 14

Answer: B

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2. An electric motor winds 200 turns of a thin coper wire on a unifrom of diameter 10 cm, in 2 seconds.then the length of the wire that is wound over the rod in one second is _____ m.

A. 30

B. 10π

C. 20π

D. none of these

Answer: B

3. A graph is drawn between the displacement and time taken for the oscillations of a simple pendulum. The length of the penddulum is _____ m (if g = 10 s^{-2} and $\pi^2 = 10$)

A. 2

B. 1

C. 0.5

D. 0.25

Answer: B

4. An athelete runs alongs a circular track of radius 14 m with a speed of 11 m s^{-1} then the time taken by the althete to complete 6 rounds is _____

A. 48 s

B. 0.8 min

C. 0.0133 h

D. All the above

Answer: D

5. A car is moving along a semicircular track asshsown in the figure in a duration of 2π second from P to Q. then choose the correct statement (s).

A. The distance coverd by the car is 14 m.

B. The average velocity of the car is $2.23ms^{-1}$

C. The average speed of the car is $3.5ms^{-1}$

D. Both (b) and (c)

Answer: D

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6. A boy dropped a ball from the top of a tower of height 125 m then the average velocity of the ball at the end of 5 second if it takes 5 s to reach the ground _____ ms^{-1}

A. 25

B. 125

C. 50

D. 250

Answer: A

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7. An electric fan rotates 100 times in one second. If the length of its wing from its axis of rotation is 0.5 m . Then the speed of the fan is _____ m s^{-1}

A. 100π

B. 50π

C. 200π

D. 100

Answer: A

8. An object moves the first half of the total distance with a speed of 2 m s^{-1} . If the average of the body is $3ms^{-1}$, the speed of the body when it travelles the remaining distance is _____ ms^{-1}
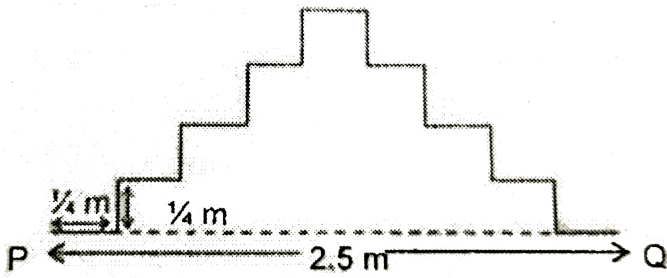
A. 3

B. 6

C. 4

D. 2

Answer: B

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9. An ant moves along the identical steps from P to Q as shown in the figure in a figure in a duration of 8.5 seonds. Then the speed and velocity

of the ant respectively are _____ m s^{-1} and _ _ _ ms^{-1}

_____ m s^{-1} and _____ m s^{-1}

A. 0.5, $\dfrac{5}{17}$

B. 0.5, 0.5

C. $\dfrac{5}{17}$, $\dfrac{5}{17}$

D. Cannot be determined

Answer: A

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10. An athelete moves along a path PQRSTUVP, in 44 seconds as shown in the figure, then the average speed of the athlete is _____ ms^{-1}

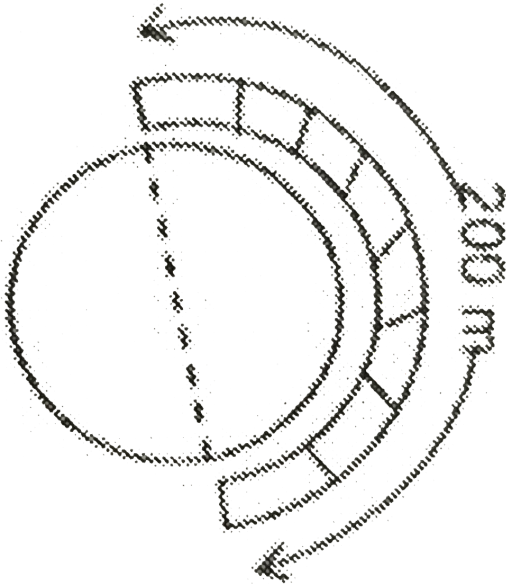A. zero

B. $\dfrac{5}{7}$

C. $\dfrac{5}{11}$

D. none of these

Answer: B

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11. A trian of length 200 m is moving along a circular path as shown in the figure. If it completers one rotation with a speed of $54 kmh^{-1}$, then the time taken by it to trace the path is _____ seconds.

A. 25

B. 13.33

C. 26.66

D. 26

Answer: C

12. A body is dropped from the top of a tower. If its average velcoity when it reaches the ground, is $10ms^{-1}$ and the time taken by it to reach the ground is 2s, the height of the tower is _____ m.
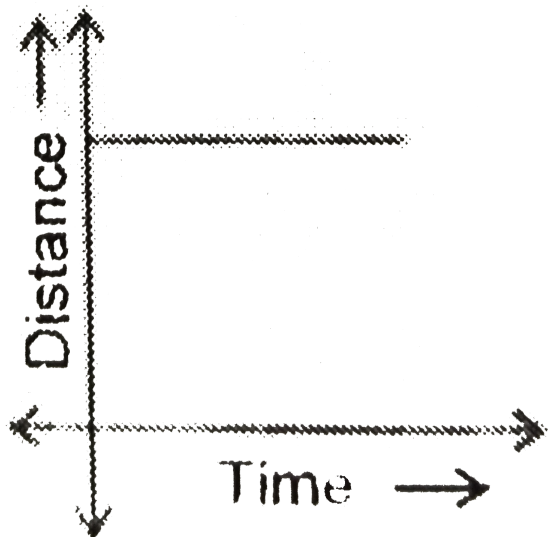
    A. 20

    B. 10
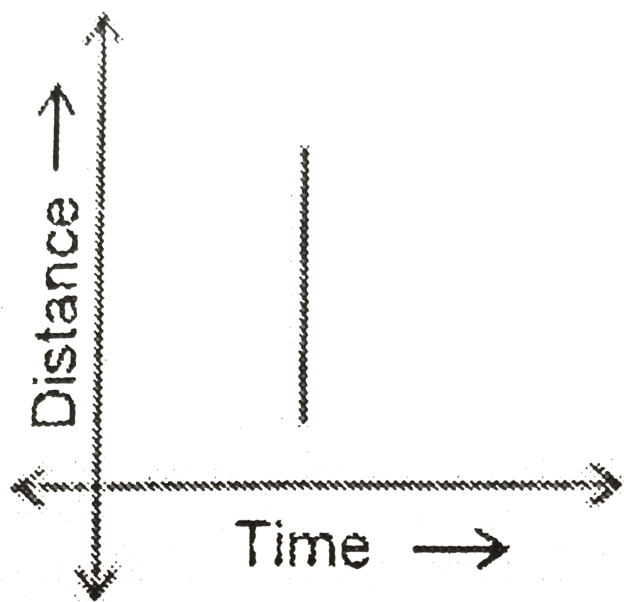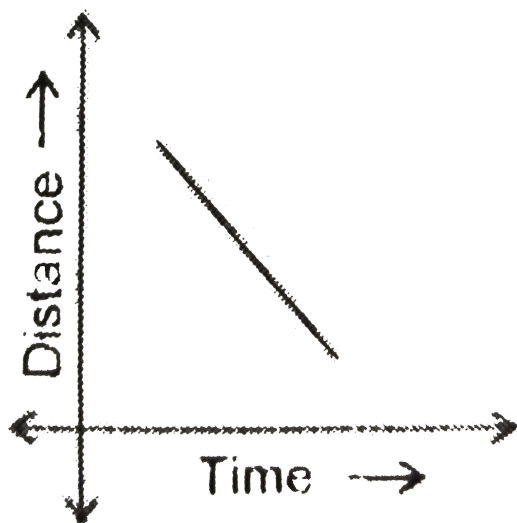
    C. 40

    D. 25

Answer: A

Level 2

1. A simple pendulum makes 20 oscillations in one second on the surface of the earth. Determine the time period of the simple pendulum on the surface of a planet where the acceleration due to gravity is one fourth of the acceleration due to gravity on the surface of the earth .
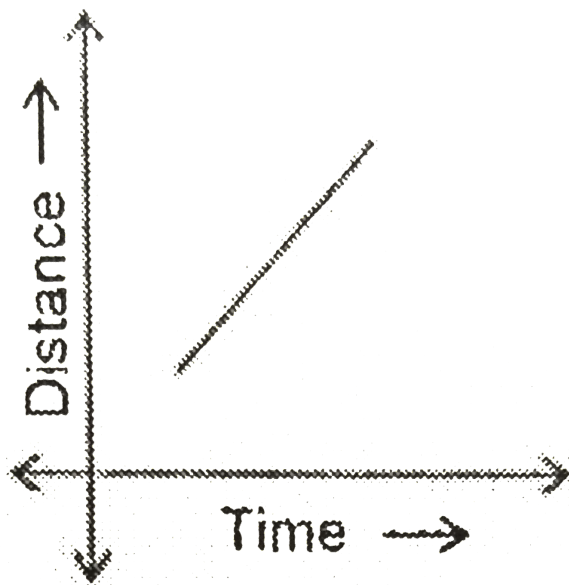
2. Which of the following distance - time graph is not possbile ? Explain why?

Distance → (vertical axis)

Time → (horizontal axis)

Distance → (vertical axis)

Time → (horizontal axis)

3. The distance between two railwat stations A and B is 440 km. two trains T_1 and T_2 start simultaneously from the stations A and B , respectively , and move twards each other. Then train T_1 and T_2 start simultaneouslym from the station A and B respectively, and move towards each other. the train T_1 moves with a constant speed of 60 kmh^{-1} and the train T_2 moves with a speed of $50kmh^{-1}$, Determine the point where they meet and the time taken for this.

4. A body travels a distance of 500 m in 10 minute. Find out the speed of the body in km h^{-1} .

5. A student goes to school with a uniform speed of $3kmh^{-1}$ and returns to his home with a speed of $2kmh^{-1}$, if the student taken 1 hour in all, then find out find distance between the school and the house.

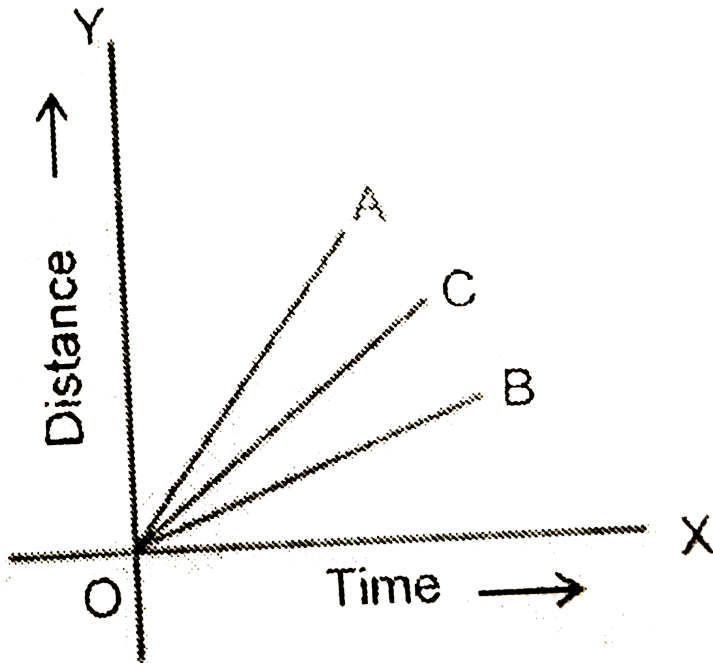**6.** Kishore walking with a uniform speed covers 20 km in 5 h. find the distance he covers in 7 hours.

7. Determine the speed of the tip of a minute hand of length 10 cm of a wall clock.

8. The distance- time graph for the motion of three vechicles,A , B and C are as shown in the figure , S_A, S_B nd S_C are the speeds, of A,B and C , respectively , compare the speeds of A, B and C.

9. Usha particpated in a marathon walk and completes the journey in 10 h. if she travels half the distance with a speed of $10kmh^{-1}$ and rest of the distance with the speed of $15kmh^{-1}$ then calculate the total distance of the marathon walk.

10. Veckat went to his collage from his house on his car with a unifrom speed of 60 kmh^{-1} and returns to his house with a different speed. If the average speed of the car, for whole journey is $50km^{h-1}$, then find the speed of his car when it travelled from college to house.

11. A boy goes to a cycle shop by walk at $5kmh^{-1}$ and comes back home by cycle at a speed of $15kmh^{-1}$, find out the average speed of the boy.

12. The distance between two stations A and B is 200 km. A train from A to B at a unifrom speed of $60 kmh^{-1}$, After half an hour another train leaves B towards, A with a unifrom speed of $80 kmh^{-1}$, Determine the distance of the point from A where the two train s meet each other.

13. Ram dropped a cricket ball of mass 700 g from the top of a tower and the ball takes 5 s to reach the ground. He then determined the maximum velocity of the body by taking acceleration of the ball as $10 ms^{-2}$ find out the value of maximum velocity.
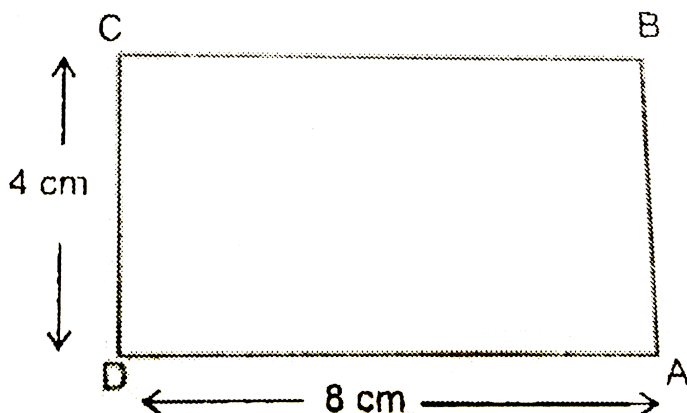
14. Raj dropped a cricket ball of mass 700 g from the top of a tower and the ball takes 5 s to reach the ground. He then determined the maximum

velocity of the body by taking acceleration of the ball as $10ms^{-2}$ find out the value of maximum velocity.

15. An ant moves a rectangular path as shown in the figure. It starts A and moves with a uniform speed of $0.01ms^{-1}$, Determine the average speed after 1 hour.

16. The distance -time graph of a body moving in a straight line is shown below. Draw the speed time graph of the motion of the body.
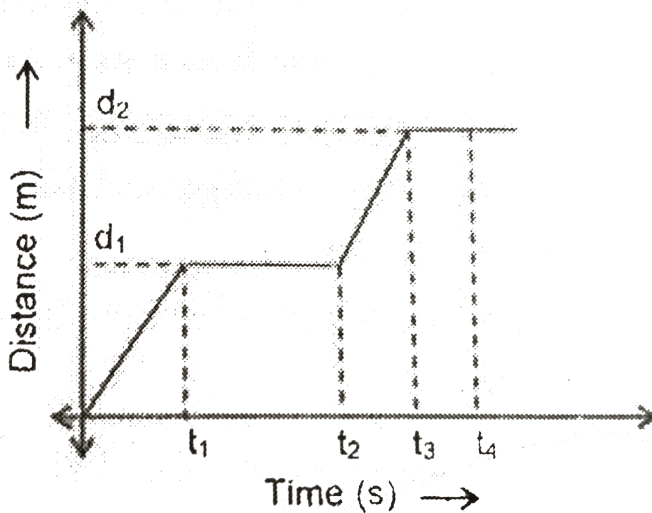
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17. Asish took a challenge to cover a distance of 1 km in 1 minute on his racing bicyle. If he covers half the distance in 3/5th of a minute. With what speed should he ride the remaining journey on his biycle ?

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18. Draw position vs time graph of uniform velocity.

Level 3

1. Can a paticle have

(i) zero speed and non - zero velocity ?

(ii) constant velocity but a varying speed ?

(iii) constant speed but a varying velcoity ?

2. A physics student obseved a train of 100 m long crossing a bridge of length 245 m . If the train is moving with a velocity of $54kmh^{-1}$, he determines the time taken by it to cross the bridge. Find his answer.
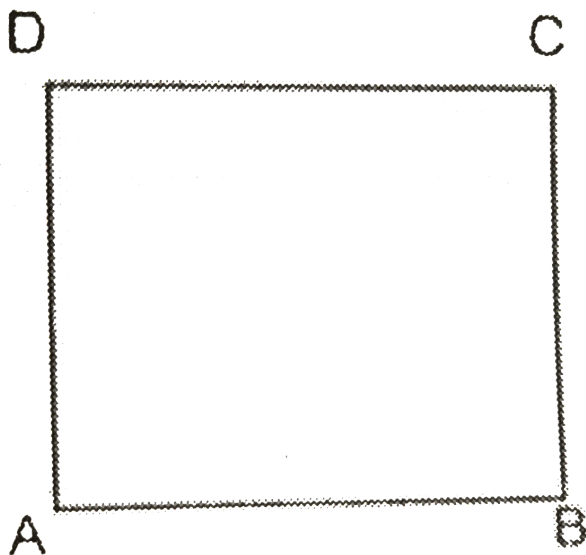
3. A body travels along a straight line for the first half of the total time with a constant speed of $20ms^{-1}$ and for the second half of the total time with a constant speed of $30ms^{-1}$. Find the average speed of the body.

4. A body starts moving from a point A along the boundaries of a square field as shown in the figure and reaches the point C after 30 s. if its speed is 1 m s^{-1}, what is the shortest distance between A and C ?

5. Ram and Raj travel along a straight line from X to Y with different unifrom speeds. Ram started from X and reaches the place Y in t s. if Raj travels half of the total distance between X and Y in 2t s, determine the ratio of speevds of Ram and Raj.

6. A car moving along a straight road with a speed of 72 km h^{-1} , is brought to rest within 3 s after the application of brakes. Calculate the deceleration produced by the brakes.

Test 1

1. Choose the correct statement:

   A. The magnitudes of sped and velocity are the same when a body travels in a straight line path.

   B. The average speed of a moving body can be equal to zero, but its average velocity cannot be equal to zero .

   C. To describe the velocity , direction is necessary.

   D. Both (a) and (c)

Answer: D

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2. Choose the correct statement (s)

   A. Both speed and velocity have the same units.

B. If a body has a speed of $50ms^{-1}$ in a striaght line path , then its velocity is $180kmh^{-1}$

C. The speed of a vechicle is measured by a device called speedometer.

D. All the above

Answer: D

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3. Assertion (A): When the length of a pendulum is 100 cm , the length used to suspend the bod is less than 100 cm.

Reason (R): The length of the pendulum is the distance between the point of suspension and the bottom most point.

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true, but R is not the correct explanation of A.

C. A is true but R is false

D. Both A and R are false.

Answer: C

4. Assertion (A), If the speed of a car moving towards the east is $20ms^{-1}$, its velcoity is $20ms^{-1}$ towards the east.

Reason (R): The velocity of a body is spend in a specified direaction.

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true, but R is not the correct explanation of A.

C. A is true but R is false

D. Both A and R are false.

Answer: A

5. The time taken by a simple pendulum to complete 20 oscillations is given in the table as shown below

S. No	Time (s)	Number of oscillations
1	20	20
2	21	20
3	20	20
4	19	20
5	20	20

study the and write the following steps in sequential order to determine the frequency of its oscillations.

(A). Find the reciprocal of average time period (T).

(B). Find the ratio of time and number of oscillations.

(C). Find the average of the values obtained in the previous step.

A. BCA

B. ABC

C. ACB

D. Both (a) and (c)

Answer: A

---

6. A farmer moves along a square field of side 10 m in one hour. Write the following steps in sequential order to find his average speed.

(A) . Find th total distance (s) covered by the farmer.

(B) Note down the total time (t) required to cover the total distance.

(C) Use the formula , average speed = $\dfrac{\text{total distance}}{\text{total time}}$

(D) Substiute the values of s and t to determine the average speed.
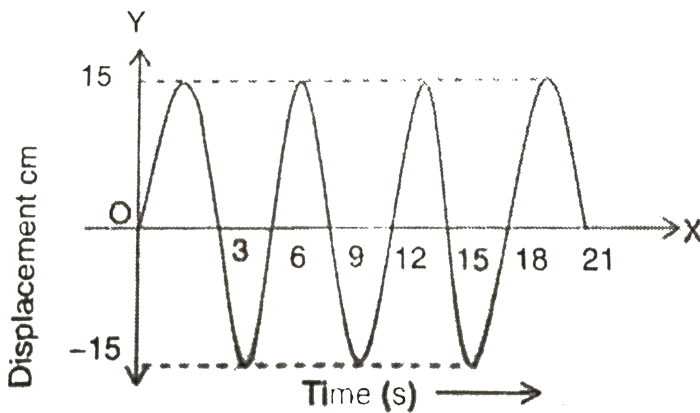
A. ABCD

B. ACDB

C. DABC

D. CDAB

Answer: A

7. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure . Then

From the given figure, the number of oscillation performed by the bob at the end of 21 s is _____
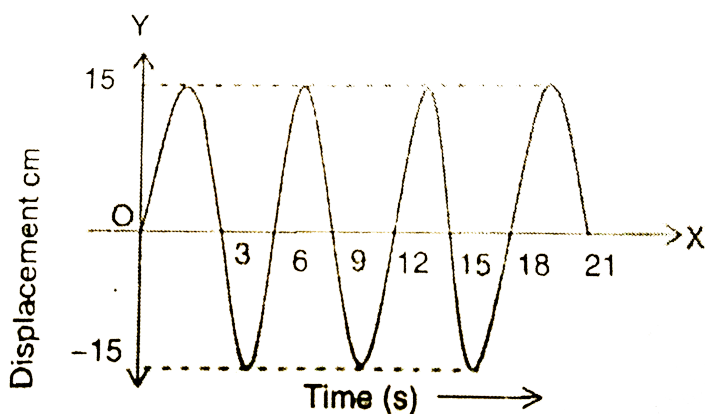

A. 3

B. 4

C. 2

D. $3^{1/2}$

Answer: D

8. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure . Then

The amplitude of oscillation of the pendulum of the bob is ____ cm .
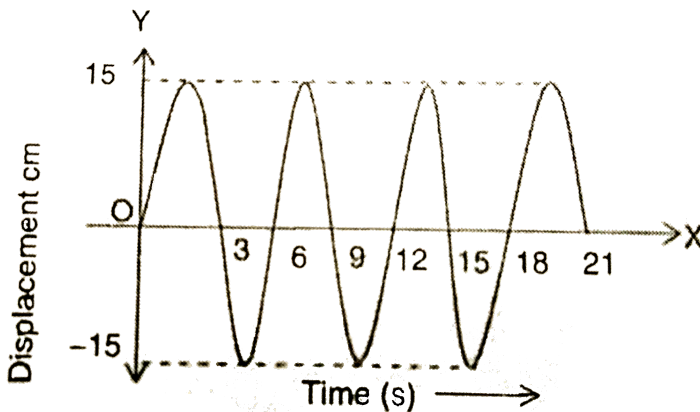

A. 15

B. 5

C. 2.5

D. 7.5

Answer: A

9. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure . Then

The number of oscillations completed by the bob in one second is _____ .

A. $1/6$

B. $1/3$

C. $1/9$

D. 1

Answer: A

10. An electric fan rotates 100 times in 50s. If the of its wing from its axis of rotation is 0.5 m, then the speed of particle at the edge of the wing is _____ $m\ s^{-1}$
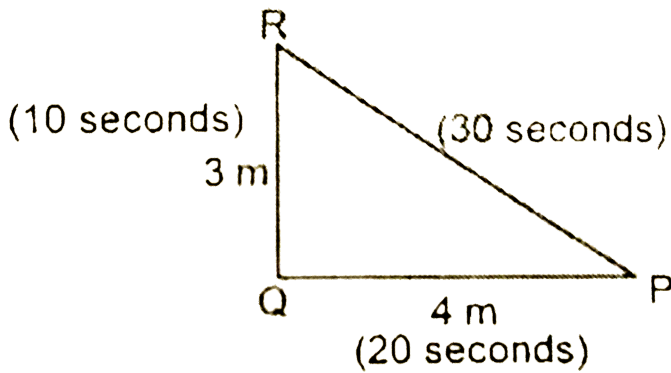
A. 2π

B. 0.5π

C. π

D. 2

Answer: A

11. A person starts from a point P and travels along a path PQRS as shown in the figure, then speed of the person is ____ ms^{-1}

A. 0.2

B. 20

C. 12

D. 0.4

Answer: A

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12. The ratiro of unit of accceleration and velocity gives unit of the physical quantity _____
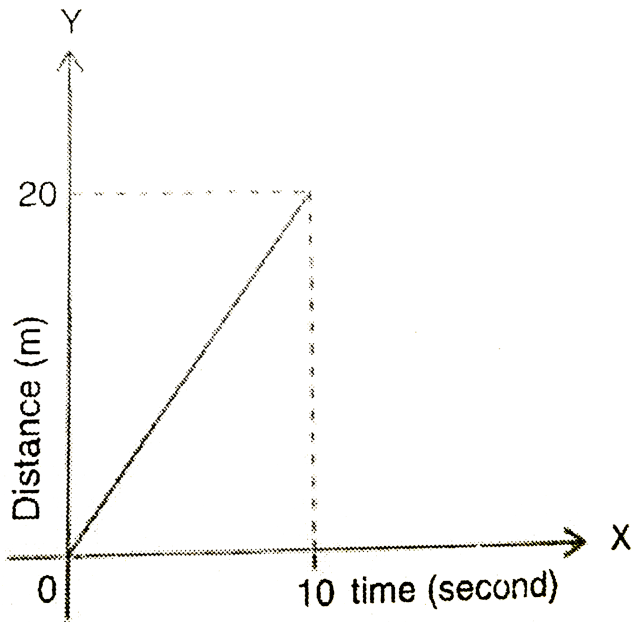
   A. time

   B. frequency

   C. amplitude

   D. speed

Answer: B

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13. The motion of a body is depicted graphically as shown in the given figure. Then the average speed of the body is _____ m^{-1}

A. $3/4$

B. $9/8$

C. $4/3$

D. $8/9$

Answer: A

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14. An object moves the first half of the total distance with a speed of 2 m s^{-1} . If the average of the body is $3ms^{-1}$, the speed of the body when it travelles the remaining distance is _____ ms^{-1}

A. 3

B. 6

C. 4

D. 2

Answer: B

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15.

Column A	Column B
(A)Rest and motion	(a) car taking a turn
(B)Oscillatory and periodic	(b)Relative
(C)Translatory and rotatory	(c)motion of the bob of a simple pendulum
(D)Variable velocity	(d)Motion of the wheels of a bicycle in moti

A. $A \rightarrow b, B \rightarrow c, C \rightarrow d, D \rightarrow a$

B. $A \rightarrow b, B \rightarrow c, C \rightarrow d, D \rightarrow d$

C. $A \rightarrow c, B \rightarrow b, C \rightarrow d, D \rightarrow a$

D. $A \rightarrow a, B \rightarrow c, C \rightarrow b, D \rightarrow d$

Answer: A

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Example

1. A horse is tied to a rope of length 5 m and the order end of the rope is tied to a pole, find the displacement and the distance travelled by the horuse in the following cases.

i. When the horse makes half revolution along a circular path.

ii. when it markes one full revolution.

iii. when it makes $\dfrac{3}{4}$ th of the revolution.

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2. A horse is tied to a rope of length 5 m and the other end of the rope is tied to a pole. Find the displacement and the distance travelled by the horse in the following cases.

When the horse makes half revolution along a circular path.

3. A horse is tied to a rope of length 5 m and the other end of the rope is tied to a pole. Find the displacement and the distance travelled by the horse in the following cases.

When it makes one full revolution.

4. A horse is tied to a rope of length 5 m and the other end of the rope is tied to a pole. Find the displacement and the distance travelled by the

horse in the following cases.

When it makes $\dfrac{3}{4}$ th of the revolution.

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1. Two hour is equal to _____ seconds.

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2. The motion of moelecules in a solid is an example for _____ motion.

▶ Watch Video Solution

3. One millisecond is ____part of a second.

▶ Watch Video Solution

4. A body moving with a velocity of $10 ms^{-1}$ increases its velocity to $20 ms^{-1}$ in 2 s. Then the rate of change in velocity is _____.

5. A car moves with a contant velocity m its average velocity is equal to its_____

6. The time period of a simple pendulum depends on its _____.

7. A body moves with unifrom sped of u ms^{-1} towards east , then the body is said to possess ____ velocity.

8. The time taken by the bob of a simple pendulum of time period (T) to move from one exrtreme positon to other extreme position is equal to _____

1. Choose the correct statement:

   A. The magnitudes of speed and velocity are same when a body travels in a straight line path.

   B. Average speed of a moving body can be equal to zero, but its average velocity cannot be equal to zero.

   C. To describe the velocity, direction is necessary.

   D. Both (a) and (c)

Answer: D

2. The ratio of unit of acceleration and velocity gives unit of the physical quantity

A. time

B. frequency

C. amplitude

D. speed

Answer: B

3. Unit of speed is ____

A. m min^{-1}

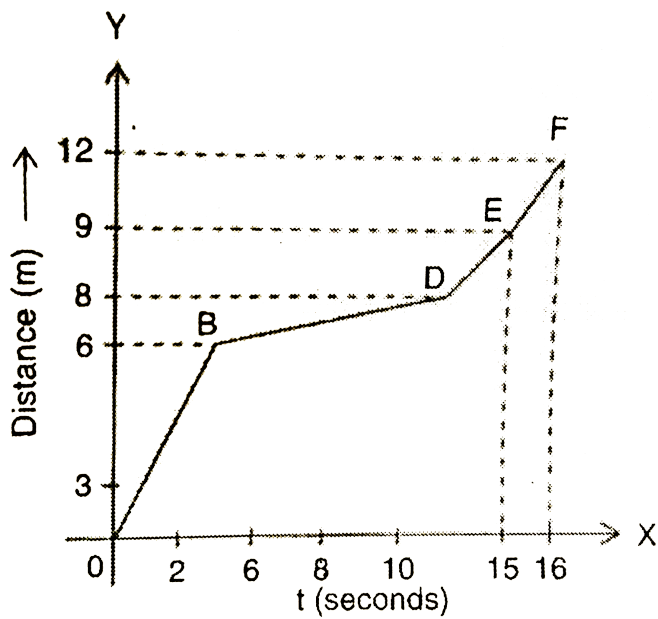B. km h^{-1}

C. km s^{-1}

D. All of the above

Answer: D

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4. The motion of a body is depicted graphically as shown in the figure, then the average speed of the body is _____ ms^{-1}.

A. $\dfrac{3}{4}$

B. $\dfrac{9}{8}$

C. $\dfrac{4}{3}$

D. $\dfrac{8}{9}$

Answer: B

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5. The speed of the tip of a second hand of length 5 cm of a clock is ____ ms^{-1}

   A. 1

   B. 60

   C. 5.3×10^{-3}

   D. 3.4×10^{-5}

Answer: C

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6. The time period of a pendulum is independent of _____

   A. length of the pendulum

   B. mass of the bob

   C. shape of the bob

   D. Both (b) and (c)

Answer: D

7. The distance between two stations is 20 km. If a train moves with a constant speed of 60 km h^{-1}, then the time taken by the train to reach the next station is ____.

A. 2 hour

B. 20 minute

C. 20 second

D. 40 minute

Answer: B

8. The distance -time graph of an object is a straight line parallel to the time axis , then the object is ____.

A. at rest

B. in uniform motion

C. moving with a uniform speed

D. moving with a non-uniform speed

Answer: A

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9. A car moves with a speed of 60 km h^{-1} for 20 min and then at a speed of 30 km h^{-1} for the next 20 min. The total distance covered by the car is ____ km.
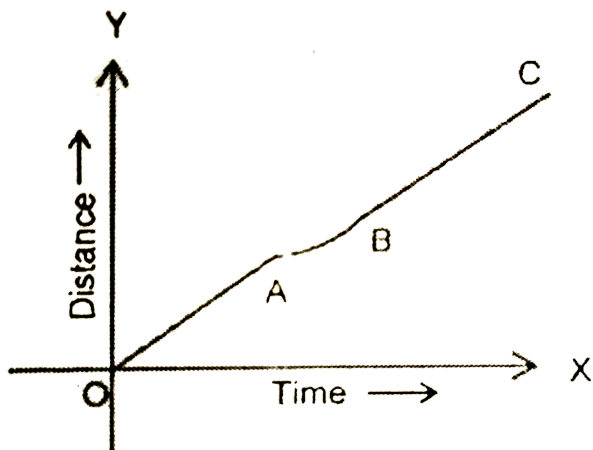
A. 10

B. 20

C. 30

D. 40

Answer: C

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10. The distance- time graph of a body is as shown in the figure. The part of the graph that represent the unifrom speed of the body is

A. OA

B. AB

C. BC

D. Both OA and BC

Answer: D

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11. A body moves with a uniform speed of 10 km h^{-1} for 2 h. The average speed of the body is _____ km h^{-1}.
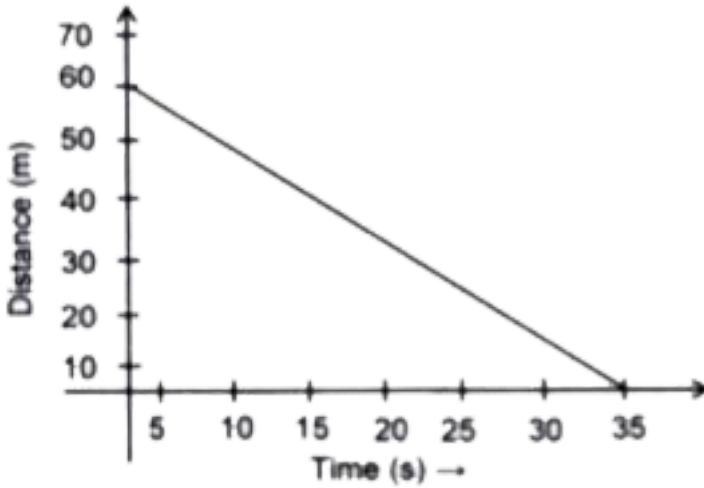
A. 10

B. 20

C. 5

D. 25

Answer: A

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12. The distance-time graph of a moving vehicle is as shown in the figure.

A. The speed of the vehicle is increasing with time.

B. The speed of the vehicle is decreasing with time.

C. The final speed of the vehicle is zero.

D. Graph is not possible.

Answer: D

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13. $1 kmh^{-1} = _____ ms^{-1}.$

A. $\dfrac{50}{3}$

B. $\dfrac{5}{18}$

C. $\dfrac{18}{5}$

D. $\dfrac{5}{8}$

Answer: B

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14. Choose the correct statement(s).

A. Speed and velocity both have same units.

B. If a body has a speed of 50 m s^{-1} in a straight line path, then its

velocity is 180 km h^{-1}.

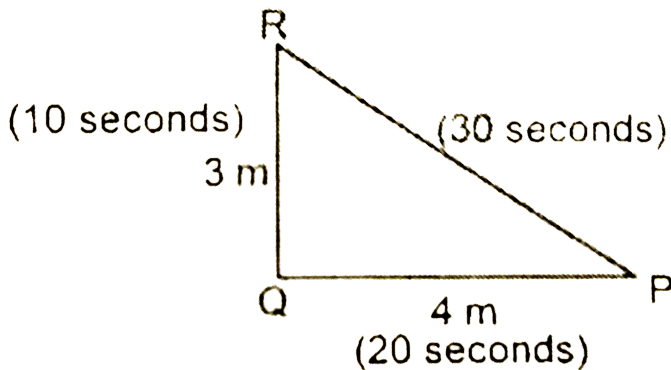C. Speed of a vehicle is measured by a device called speedometer.

D. All of the above

Answer: D

15. A person starts from a point P and travels along a path PQRS as shown in the figure, then speed of the person is ____ ms^{-1}

A. 0.2

B. 20

C. 12

D. 0.4

Answer: A

16. A simple pendulum was given to a physics student to determine its time period. Arrange the following steps in sequential order to determine its time period.

(A). Calculate the radius of the bob 'R' by divding the diameter by 2.

(B) Take a metre scale and measure the length of the string from the point of suspension to the lower tip of the bob (l_1)

(C). Place the bob over a meter scale and hold it in postion with two wooden blocks of stiff cadboards. Measure the diamter (D)of the bob.

(D). NOW, the length of the pendulum (l) is given by $(l_1 - R)$

E. Consider the formula $T = 2\pi. \sqrt{\dfrac{l}{g}}$ calculate.

The time period of the simple pendulum.

    A. ABCDE

    B. EDCBA

C. BCADE

D. DEABC

Answer: C

---

17. A body cover 20 m in 2 s and another 20 m in next 4s. Arrange the following steps in sequential order to find th average velocity of the body .

(A) Find the displacements of the body in first 2s and next 4 s from the given data.

(B) find the displacements of the body .

(C) find the total time taken by the body to complete the total displacement .

(D) Use the formula, average velocity $= \dfrac{\text{total displacement}}{\text{Total time taken}}$
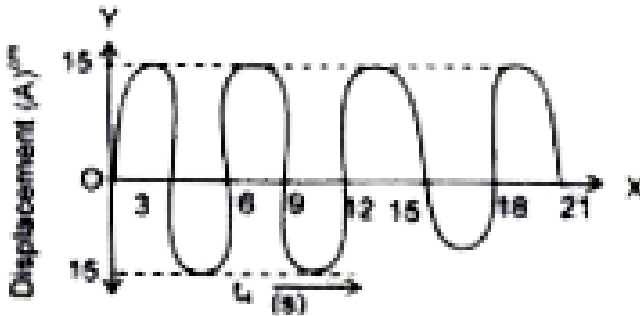
A. ABCD

B. ADCB

C. DCBA

D. DBCA

Answer: A

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18. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure. Then

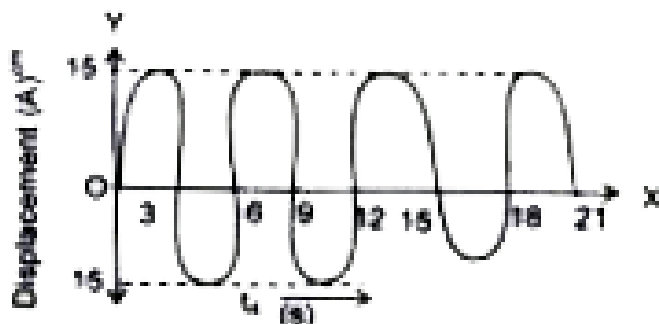Time period of the pendulum bob is _____ s.

A. 9

B. 6

C. 4.5

D. 3

Answer: B

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19. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure. Then

The number of oscillations completed by the bob in one second is _____.

A. $\dfrac{1}{6}$

B. $\dfrac{1}{3}$
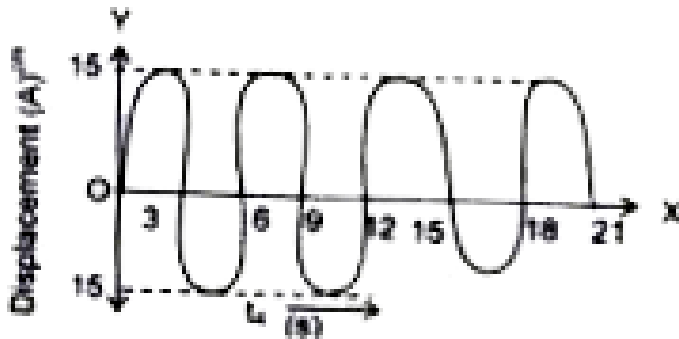
C. $\dfrac{1}{9}$

D. 1

20. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure. Then

The amplitude of oscillation of the pendulum bob is ____ cm.
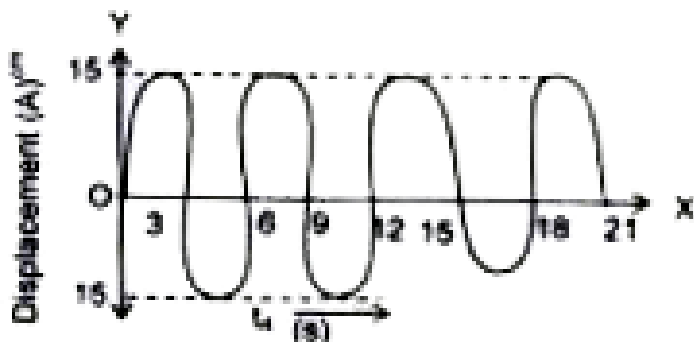
A. 15

B. 5

C. 2.5

D. 7.5

Answer: A

▶ Watch Video Solution

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21. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure. Then

From the given figure the number of oscillations per-formed by the bob at the end of 21 s is _____.

A. 3

B. 4

C. 2

D. $3\frac{1}{2}$

Answer: D

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Test Your Concepts Very Short Answer Type Questions Match The Column

1. Match the entries given in Column A with the appropriate ones in Column B.

Column A	Column B
A. Periodic motion	( ) a. Maximum displacement of vibrating particle from its mean position
B. Vibratory motion	( ) b. The piston of a motor car engine at uniform speed
C. Body at rest	( ) c. Non-uniform motion
D. Amplitude	( ) d. 18/5 km h^{-1}
E. Variable speed	( ) e. Oscillating objects undergo change in shape or size
F. 1 m s^{-1}	( ) f. $\dfrac{\text{Total displacement}}{\text{Total time}}$
G. Average velocity	( ) g. Zero velocity

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2. Match the entries given in Column A with the appropriate ones in Column B.

Column A		Column B
A. Curvilinear motion	( ) a.	Motion that repeats itself at irregular intervals of time
B. Rectilinear motion	( ) b.	Wings of a ceiling fan
C. Rotatory motion	( ) c.	A shell fired from artillery gun
D. Body moving with uniform velocity	( ) d.	A stone dropped from a tower
E. Length of a pendulum	( ) e.	Point of suspension to the midpoint of the bob
F. Time period of a simple pendulum	( ) f.	Square root of the length of the pendulum
G. Non-periodic motion	( ) g.	Zero acceleration

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3. Match the entries given in Column A with the appropriate ones in Column B.

Column A	Column B
A. Circular motion	( ) a. Vehicle crossing over a flyover bridge
B. Rectilinear motion	( ) b. One to-and-fro motion
C. Curvilinear motion	( ) c. Distance–time graph is a straight line
D. $\dfrac{v-u}{a}$	( ) d. 100 cm
E. Constant speed	( ) e. Time (t)
F. Oscillation	( ) f. A spinning top
G. The length of a seconds pendulum (take $g = 10$ m s^{-2})	( ) g. Coin moving over a carrom board

▶ View Text Solution

1. When can the speed and average speed of a vehicle be equal?

▶ Watch Video Solution

2. While determining the time period of a simple pendulum, why the time for 20 or more oscillations is found?

▶ Watch Video Solution

3. Define amplitude and frequency. Write their SI units.

▶ Watch Video Solution

4. Name the physical quantity that measures fastness or slowness of a moving object.

▶ Watch Video Solution

5. Two cars A and B move on a straight road for the same time. Car A covers 80 m and car B covers 100 m. Which one of the two is faster?

▶ Watch Video Solution

6. Assertion (A): Quartz clocks are more accurate than pendulum clocks.

Reason (R): Quartz clocks use periodic motion of simple pendulum for the measurement of time.

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7. If the speed of an object is known, how can we find the distance covered by it in a given time?

▶ **Watch Video Solution**

8. What are the different types of graphs that can be drawn to represent the motion of a particle?

▶ **Watch Video Solution**

9. Give an example for simultaneous translatory and rotatory motion of a ody

▶ **Watch Video Solution**

10. Define rest and motion.

▶ **Watch Video Solution**

11. Define acceleration and state its SI unit.

▶ **Watch Video Solution**

12. What is a seconds pendulum? What is its approximate length?

▶ **Watch Video Solution**

13. Find the relationship between the time period of the pendulum and the length of the pendulum.

▶ **Watch Video Solution**

14. In a 100 m race, A touches the finishing line in 10.5 second and B touches it in 11 second. Who is faster, A or B?

▶ **Watch Video Solution**

15. What is meant by average speed? How is it calculated?

▶ **Watch Video Solution**

16. When do we say that a pendulum has completed one oscillation?

▶ **Watch Video Solution**

1. Give two examples for each of the motion along a straight line, circular motion and periodic motion.

▶ **Watch Video Solution**

2. Define velocity and explain how it is different from speed.

▶ **Watch Video Solution**

3. Derive the relation between acceleration, change in velocity and time.

▶ **Watch Video Solution**

4. Explain the terms : uniform motion and non-uniform motion with examples.

▶ **Watch Video Solution**

5. How are rest and motion relative ? Exaplain with an example.

6. A simple pendulum of length 'l' and time period 'T' on earth is taken onto the surface of moon. How should the length of the simple pendulum be changed on the moon such that the time period is constant.

(Take $g_e = 6g_m$)

Test Your Concepts Essay Type Questions

1. Describe the experimental method to determine the time period of a simple pendulum.

1. One hour is equal to 3600 second.

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2. The motion of a simple pendulum is an example of oscillatory motion. ?

▶ **Watch Video Solution**

3. A nanosecond is one billionth of a second.

▶ **Watch Video Solution**

4. When an object is moving with a unifrom speed, its average speed is equal to its speed

5. We can use a simple pendulum to measure the time.

6. By using distance-time graph we can find out the average speed of an object.

7. Speedoneter is used to measuere the distance travelled by a vehicle.

8. The distance-time graph of the motion of an object moving with a contant speed is a straight line.

Concept Application Level 1 Fill In The Blanks

1. _____ measures the distance moved by a vehicle.

▶ Watch Video Solution

2. A body is said to be moving with unifrom speed if it covers equal distance in _____

▶ Watch Video Solution

3. One microsecond is_____ of a second.

▶ Watch Video Solution

4. SI unit of speed is _____

5. One Kilometer is equal to _____ metre.

6. The time taken by the pendulum to complete one oscillation is called_____

7. The distance coverd by an object in a unit time is known as the _____ of the object.

8. An object moving along a straight line with a constant speed is said to be in ____

> ▶ Watch Video Solution

9. The speed of the bob of a simple pendulum is maximum at its _____.

> ▶ Watch Video Solution

10. The time period of a simple pendulum of length 1 m is _____ second. (take $\pi^2 = 10, g = 10ms^{-2}$)

> ▶ Watch Video Solution

Concept Application Level 1 Select The Correct Alternative

1. Choose the correct statement:

A. Every oscillatory motion is periodic in nature.

B. Every periodic motion is oscillatory in nature.

C. The motion of a pendulum bob is periodic in nature (within its

small amplitude).

D. Both (a) and (c)

Answer: D

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2. $T = 2\pi\sqrt{\dfrac{l}{g}}$ is the time period of a simple pendulum, then the unit of

$4\pi^2\dfrac{l}{T^2}$ in SI system is _____ .

A. ms^{-1}

B. s^{-2}

C. ms^{-2}

D. s^{-1}

Answer: C

3. The speed of a body can never be _____.

    A. positive

    B. negative

    C. zero

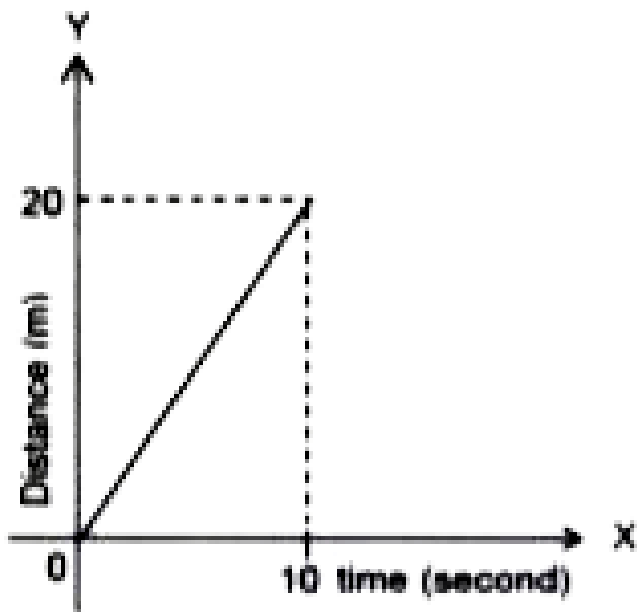   D. Both (a) and (c)

Answer: B

4. The motion of a body is depicted graphically as shown in the given figure. Then

A. The average speed of the body is $2ms^{-1}$.

B. The average speed of the body is zero.

C. The body changes its direction twice.

D. All of the above

Answer: A

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5. A body travels 10 m in 2s then the speed of the body is _____ $m\,s^{-1}$.

A. 20

B. 40

C. 5

D. 10

Answer: C

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6. A body moves with a speed of $2\pi m s^{-1}$ in a cirular path of radius 1 m , then the time taken to compete one revolution is _____.

A. 1

B. 2

C. 3

D. 4

Answer: A

7. The odometer of a bus reads 6700 klm when it starts from the station at 9a.m. and when it comes back to the sation at 10 p.m. the odometer reading is found to be 6960 km, then the average speed of the bus in the would journey is ____kmh^{-1}

A. 10

B. 20

C. 30

D. 40

Answer: B

8. A pendulum completers 120 oscillations hin one minute then the time period of the pendulum is _____ s.

A. 0.5

B. 120

C. 2

D. 3

Answer: A

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9. A body moves with a contant speed of $10ms^{-1}$ for 1 hour. The distance travelled by the body is ____

A. 36,000 km

B. 36 km

C. 24 km

D. 24×10^3 m

Answer: B

10. It takes 1 s for the bob to moves from one extreme position to other extreme postion. Then the time period of the pendulum is _____ s.

A. 1

B. 2 h

C. 3

D. 4

Answer: B

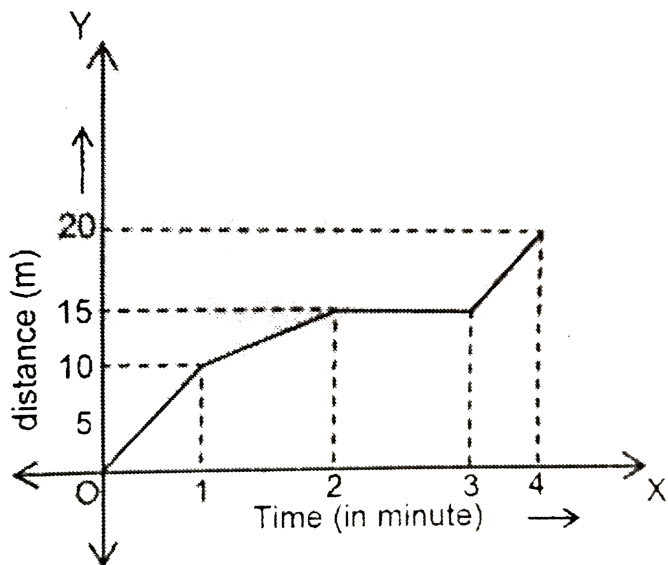**11.** A body projected upwards from the top of a builing is an example of

_____

A. uniform motion

B. non-uniform motion

C. periodic motion

D. oscillatory motion

Answer: B

▶ **Watch Video Solution**

12. Distance versus time graph of an object is as shown in the figure. The average speed of the object is _____ ms^{-1}

A. 0.08

B. 0.5

C. 1

D. 2

Answer: A

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13. $20ms^{-1}$ __ __ kmh^{-1}

A. 12.5

B. 72

C. 50/9

D. 32

Answer: B

---

14. Choose the correct statement:

A. Unit of acceleration is ms^{-2}

B. Speed = distance/time.

C. If a body moves with uniform velocity, its acceleration is zero.

D. All of the above

Answer: D

15. A car drive accelerates the car to increase its speed from 30 km h^{-1} to $60kmh^{-1}$ in 5 min. Arrage the following steps a sequence to obtain the acceleration of the car.

(A) Use the formula , rate of change of velocity $=$ $$\frac{\text{Total change in veclocity}}{\text{Total time required for change}}$$

(B) Obtain the final velocity (v) , of the car.

(C) Find the time taken to increase the speed of the car from u to v let it be 't'

(D) find the initial velocity (u) of the car.

(E) Substitute the values in the formula and calulate the acceleration of the car.

    A. EABCD

    B. ABCDE

    C. DBCAE

    D. EDCBA

Answer: C

16. Find the acceleration due to gravity on the surface of the moon by taking a seconds pendulum from the earth's surface. Arrange the following steps in sequential order to solvbe the above problem.

(A) Find the time period of this simple pendulum on the surface of the moon using a stop clock $[T_M]$

(B) The acceleration due to gravity on the moon (gm) is 1/6th the accleration due to gravity on the earth (ge).

(C) Use the formula , $T = 2\pi\sqrt{\dfrac{l}{g}}$

(D) first , take pendulum to the surface of the moon without altering the length of the pendulum (l), .

(E) Substibe the value of T_M in (a), then $\dfrac{T_E}{T_M}\sqrt{\dfrac{g_M}{g_E}}$, and obtain the value of (g_m)
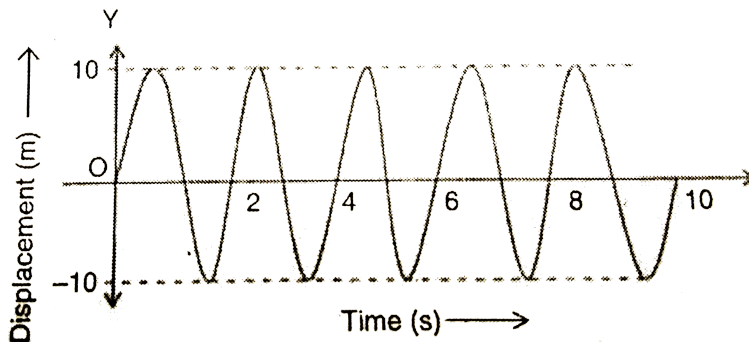
A. ABCDE

B. DACEB

C. CBADE

D. CABED

Answer: B

17. A graph is drawn between the displacement and time taken for the oscillations of a simple pendulum.find the no of oscillation?
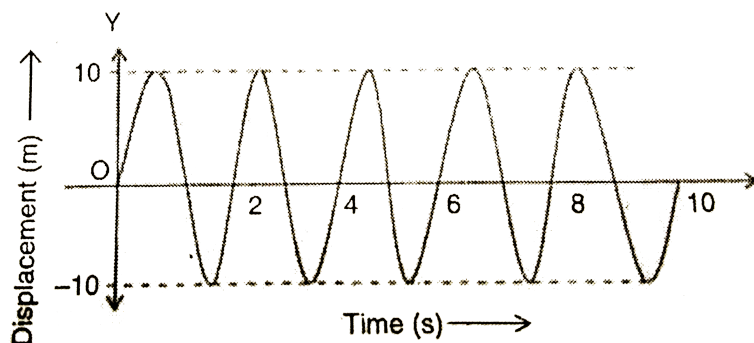

A. 0.5

B. 2 h

C. 50

D. 100

Answer: A

> ▶ **Watch Video Solution**

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18. A graph is drawn between the displacement and time taken for the oscillations of a simple pendulum.find the no of oscillation?
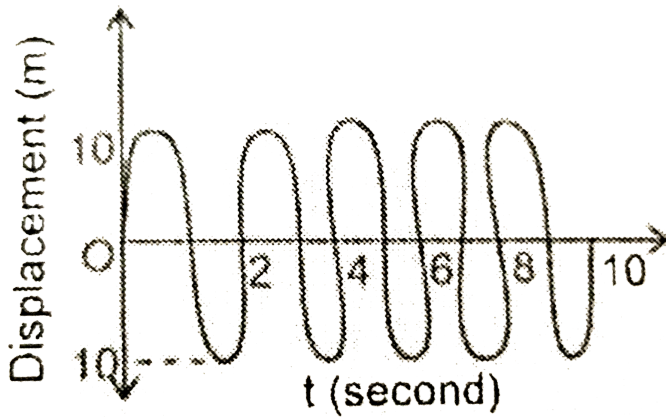

A. $4\frac{1}{2}$

B. 5

C. 6

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

Answer: B

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19. The time taken to complete 100 oscillations is _____ s.

A. 100

B. 200

C. 50

D. 25

Answer: B

Concept Application Level 1 Match The Column

1. Match the entries given in Column A with the appropriate ones in Column B.

	Column A			Column B
A.	Vibratory motion	( )	a.	Distance – time graph is not a straight line
B.	Rotatory motion	( )	b.	Speed × time
C.	Seconds pendulum	( )	c.	Musical instruments
D.	Distance travelled	( )	d.	The rate of change of motion in specific direction
E.	Variable speed	( )	e.	Potter's wheel
F.	Velocity	( )	f.	2 s

2. Match the entries given in Column A with the appropriate ones in Column B.

Column A		Column B
A. Speed	( ) a.	Uniform motion
B. Time	( ) b.	Non-uniform motion
C. Average speed	( ) c.	km h⁻¹

D. Uniform speed in a straight line	( ) d.	second
E. Freely falling body	( ) e.	Change in time period
F. Change in length of a pendulum	( ) f.	Total distance / Total time

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3. Match the entries given in Column A with the appropriate ones in Column B.

Column A		Column B
A. Non-uniform motion	( )	a. To measure speed of the vehicle
B. Oscillatory motion	( )	b. Uniform motion
C. Mean position	( )	c. A cricket ball that rolls over ground
D. Speedometer	( )	d. The needle of sewing machine that moves up and down
E. Constant speed	( )	e. Freely suspended pendulum at rest
F. Acceleration	( )	f. $\dfrac{\text{Total change in velocity}}{\text{Total time taken for change}}$

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Concept Application Level 2 Select The Correct Alternative

1. A vechicle travels along a straight path between two places α and β. It travels first half of the distance with a velocity of 72 km h^{-1} and the remaining distance with a velocity of 36 km h^{-1} then the average velocity

of the vehicle is _____ ms^{-1}

α

β

A. 11. $\bar{3}$

B. 13. $\bar{3}$

C. 15

D. 14

Answer: B

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2. An electric motor winds 200 turns of a thin coper wire on a unifrom of diameter 10 cm, in 2 seconds.then the length of the wire that is wound over the rod in one second is _____ m.

A. 30

B. 10π

C. 20π

D. None of these

Answer: B

3. A graph is drawn between the displacement and time taken for the oscillations of a simple pendulum is 2s. The length of the penddulum is

_____ m (if g = 10 s^{-2} and $\pi^2 = 10$)

A. 2

B. 1

C. 0.5

D. 0.25

Answer: B

4. An athelete runs alongs a circular track of radius 14 m with a speed of 11 m s^{-1} then the time taken by the althete to complete 6 rounds is _____
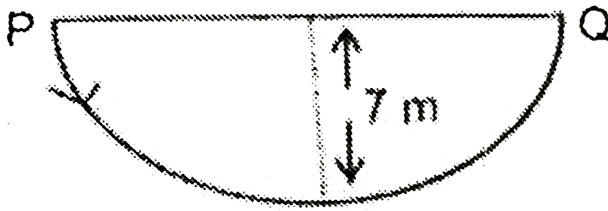
A. 48 s

B. 0.8 min

C. 0.0133 h

D. All of the above

Answer: D

5. A car is moving along a semicircular track ashsown in the figure in a duration of 2π second from P to Q. then choose the correct statement (s).

P   Q

7 m

A. The distance covered by the car is 14 m.

B. The average velocity of the car is 2.23 m s^{-1}.

C. The average speed of the car is $3.5ms^{-1}$.

D. Both (b) and (c)

Answer: D

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6. A boy dropped a ball from the top of a tower of height 125 m then the average velocity of the ball at the end of 5 second if it takes 5 s to reach the ground _____ ms^{-1}

A. 25

B. 125

C. 50

D. 250

Answer: A

> ▶ **Watch Video Solution**

7. An electric fan rotates 100 times in one second. If the length of its wing from its axis of rotation is 0.5 m . Then the speed of the fan is _____ m s^{-1}

A. 100π

B. 50π

C. 200π

D. 100

Answer: A

8. An object moves the first half of the total distance with a speed of 2 m s^{-1} . If the average of the body is $3ms^{-1}$, the speed of the body when it travelles the remaining distance is _____ ms^{-1}

A. 3

B. 6

C. 4

D. 2

Answer: B

9. An ant moves along the identical steps from P to Q as shown in the figure in a figure in a duration of 8.5 seonds. Then the speed and velocity

of the ant respectively are _____ m s^{-1} and _ _ _ _ ms^{-1}

_____ m s^{-1} and _____ m s^{-1}

A. 0.5, $\dfrac{5}{17}$

B. 0.5, 0.5

C. $\dfrac{5}{17}, \dfrac{5}{17}$

D. Cannot be determined

Answer: A

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10. An athelete moves along a path PQRSTUVP, in 44 seconds as shown in the figure, then the average speed of the athlete is _____ ms^{-1}

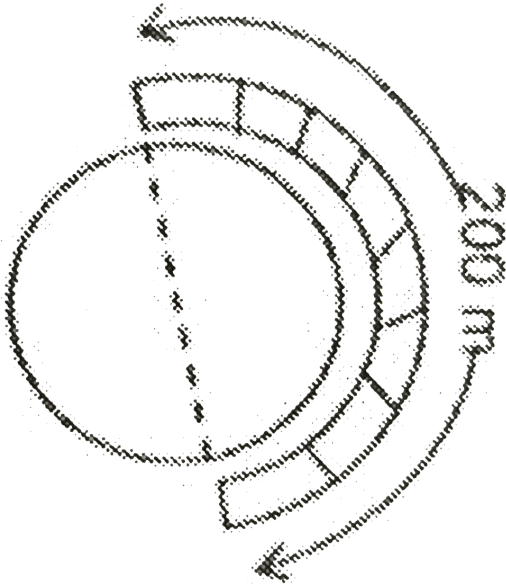A. zero

B. $\dfrac{5}{7}$

C. $\dfrac{5}{11}$

D. None of these

Answer: B

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11. A trian of length 200 m is moving along a circular path as shown in the figure. If it completers one rotation with a speed of $54kmh^{-1}$, then the time taken by it to trace the path is _____ seconds.

A. 25

B. 13.33

C. 26.66

D. 26

Answer: C

12. A body is dropped from the top of a tower. If its average velcoity when it reaches the ground, is $10ms^{-1}$ and the time taken by it to reach the ground is 2s, the height of the tower is _____ m.

A. 20

B. 10

C. 40

D. 25

Answer: A

13. A simple pendulum makes 20 oscillations in one second on the surface of the earth. Determine the time period of the simple pendulum on the
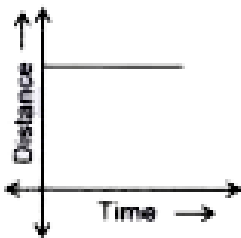
surface of a planet where the acceleration due to gravity is one fourth of the acceleration due to gravity on the surface of the earth .
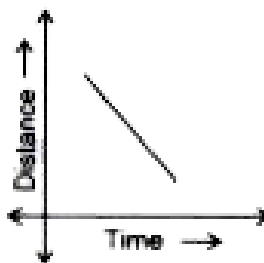
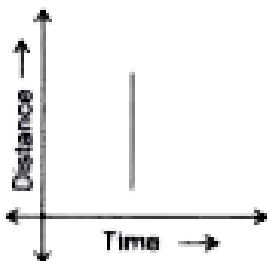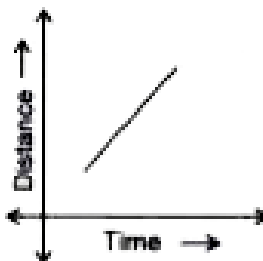**14.** Which of the following distance-time graphs is not possible? Explain why?

(1)

(2)

(3)

(4)

15. The distance between two railwat stations A and B is 440 km. two trains T_1 and T_2 start simultaneously from the stations A and B , respectively , and move twards each other. Then train T_1 and T_2 start simultaneouslym from the station A and B respectively, and move towards each other. the trainT_1 moves with a constant speed of 60 kmh^{-1} and the train T_2 moves with a speed of $50 kmh^{-1}$, Determine the point where they meet and the time taken for this.

▶ Watch Video Solution

16. A body travels a distance of 500 m in 10 minute. Find out the speed of the body in km h^{-1} .

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17. A student goes to school with a uniform speed of $3 kmh^{-1}$ and returns to his home with a speed of $2 kmh^{-1}$, if the student taken 1 hour in all, then find out find distance between the school and the house.

18. Kishore walking with a uniform speed covers 20 km in 5 h. find the distance he covers in 7 hours.

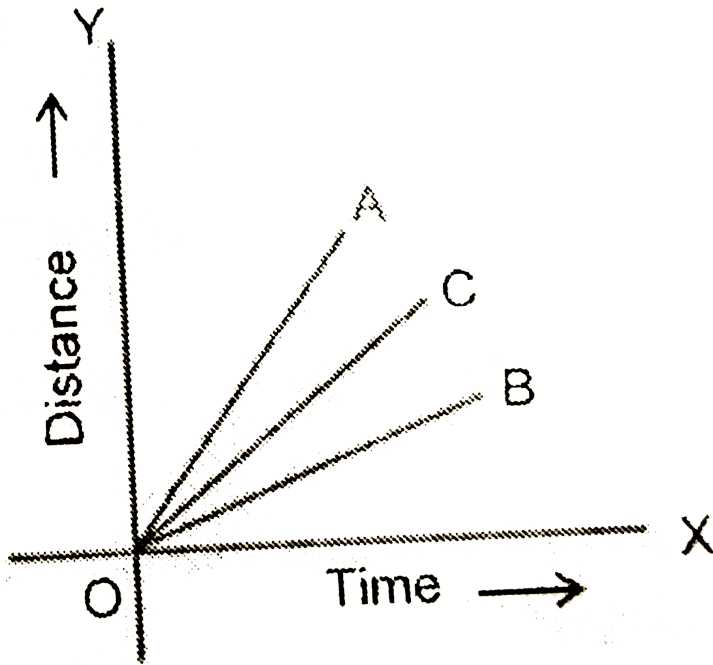**19.** Determine the speed of the tip of a minute hand of length 10 cm of a wall clock.

20. The distance- time graph for the motion of three vechicles,A , B and C are as shown in the figure , $S_A, S_B nd S_C$ are the speeds, of A,B and C ,

respectively , compare the speeds of A, B and C.

21. Usha particpated in a marathon walk and completes the journey in 10 h. if she travels half the distance with a speed of $10 kmh^{-1}$ and rest of the distance with the speed of $15 kmh^{-1}$ then calculate the total distance of the marathon walk.

22. Vikash went to his collage from his house on his car with a unifrom speed of 60 kmh^{-1} and returns to his house with a different speed. If the average speed of the car, for whole journey is $50 km^{h-1}$, then find the speed of his car when it travelled from college to house.

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23. A boy goes to a cycle shop by walk at $5 kmh^{-1}$ and comes back home by cycle at a speed of $15 kmh^{-1}$, find out the average speed of the boy.

▶ **Watch Video Solution**

24. The distance between two stations A and B is 200 km. A train from A to B at a unifrom speed of $60 kmh^{-1}$, After half an hour another train leaves B towards, A with a unifrom speed of $80 kmh^{-1}$, Determine the distance of the point from A where the two train s meet each other.

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25. A train starting from a railway station and moving with uniform acceleration attains a speed $40km/h$ in 10 minutes. Find its acceleration.
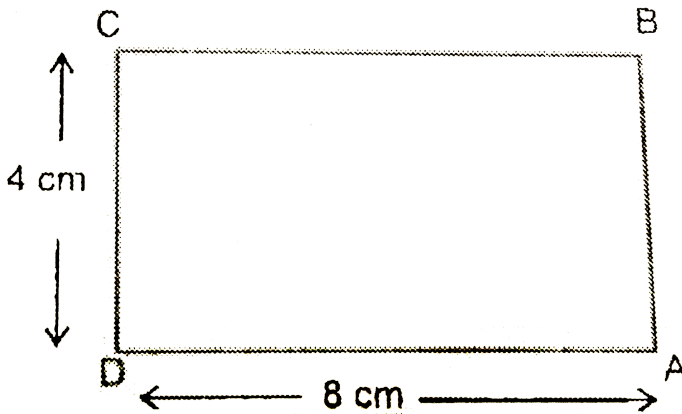
26. Raj dropped a cricket ball of mass 700 g from the top of a tower and the ball takes 5 s to reach the ground. He then determined the maximum velocity of the body by taking acceleration of the ball as $10ms^{-2}$ find out the value of maximum velocity.
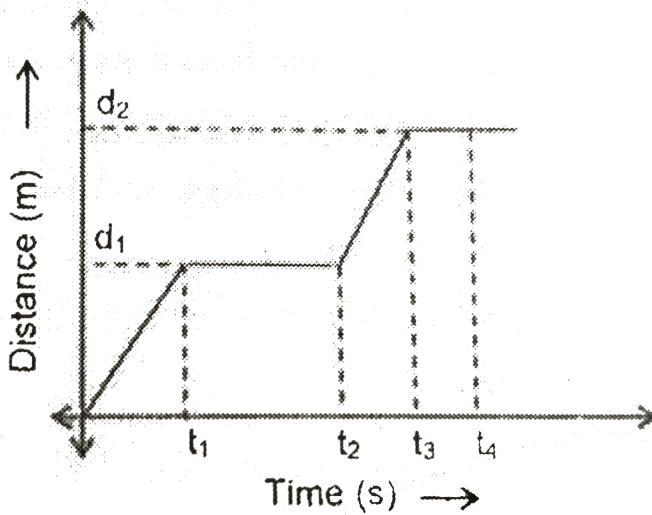
27. An ant moves a rectangular path as shown in the figure. It starts A and moves with a uniform speed of $0.01ms^{-1}$, Determine the average speed

after 1 hour.

28. The distance -time graph of a body moving in a straight line is shown below. Draw the speed time graph of the motion of the body.

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29. Asish took a challenge to cover a distance of 1 km in 1 minute on his racing bicyle. If he covers half the distance in 3/5th of a minute. With what speed should he ride the remaining journey on his biycle ?

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30. A body moves along a straight line. In every t-s the speed of the body decreases uniformly to half of the original speed. Draw the speed-time

graph of the body.

1. Can a paticle have

(i) zero speed and non - zero velocity ?

(ii) constant velocity but a varying speed ?

(iii) constant speed but a varying velcoity ?

2. A physics student obseved a train of 100 m long crossing a bridge of length 245 m . If the train is moving with a velocity of $54 kmh^{-1}$, he determines the time taken by it to cross the bridge. Find his answer.
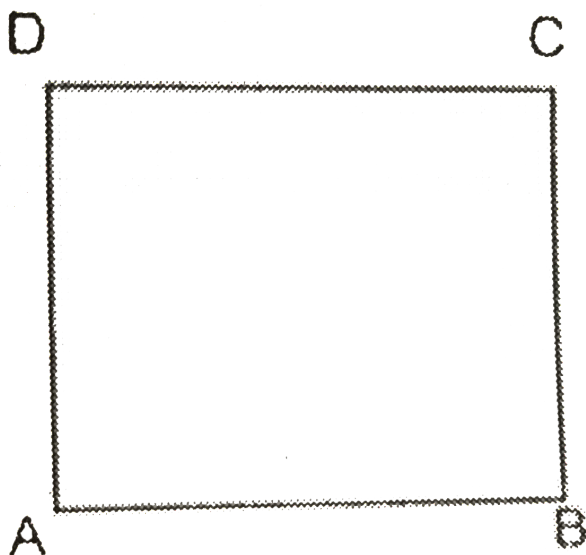
3. A body travels along a straight line for the first half of the total time with a constant speed of $20ms^{-1}$ and for the second half of the total time with a constant speed of $30ms^{-1}$. Find the average speed of the body.

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4. A body starts moving from a point A along the boundaries of a square field as shown in the figure and reaches the point C after 30 s. if its speed is 1 m s^{-1}, what is the shortest distance between A and C ?

5. Ram and Raj travel along a straight line from X to Y with different unifrom speeds. Ram started from X and reaches the place Y in t s. if Raj travels half of the total distance between X and Y in 2t s, determine the ratio of speevds of Ram and Raj.

6. A car moving along a straight road with a speed of 72 km h^{-1} , is brought to rest within 3 s after the application of brakes. Calculate the deceleration produced by the brakes.

Assessment Test Test 1 Select The Correct Alternative

1. Choose the correct statement.

A. The magnitudes of speed and velocity are the same when a body travels in a straight line path.

B. The average speed of a moving body can be equal to zero, but its average velocity cannot be equal to zero.

C. To describe the velocity, direction is necessary.

D. Both (a) and (c)

Answer: D

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2. Choose the correct statement(s).

A. Both speed and velocity have the same units.

B. If a body has a speed of 50 m s^{-1} in a straight line path, then its velocity is 180 km h^{-1}.

C. The speed of a vehicle is measured by a device called speedometer.

D. All of the above

Answer: D

3. Assertion (A): When the length of a pendulum is 100 cm , the length used to suspend the bod is less than 100 cm.

Reason (R): The length of the pendulum is the distance between the point of suspension and the bottom most point.

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true, but is not the correct explanation of A.

C. A is true but R is false.

D. Both A and R are false.

Answer: C

4. Assertion (A), If the speed of a car moving towards the east is $20ms^{-1}$, its velcoity is $20ms^{-1}$ towards the east.

Reason (R): The velocity of a body is spend in a specified direaction.

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true, but is not the correct explanation of A.

C. A is true but R is false.

D. Both A and R are false.

Answer: A

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5. The time taken by a simple pendulum to complete 20 oscillations is given in the table as shown below

S. No	Time (s)	Number of oscillations
1	20	20
2	21	20
3	20	20
4	19	20
5	20	20

study the and write the following steps in sequential order to determine the frequency of its oscillations.

(A). Find the reciprocal of average time period (T).

(B). Find the ratio of time and number of oscillations.

(C). Find the average of the values obtained in the previous step.

A. BCA

B. ABC

C. ACB

D. Both (a) and (c)

Answer: A

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6. A farmer moves along a square field of side 10 m in one hour. Write the following steps in sequential order to find his average speed.

(A) . Find th total distance (s) covered by the farmer.

(B) Note down the total time (t) required to cover the total distance.

(C) Use the formula , average speed = $\dfrac{\text{total distance}}{\text{total time}}$

(D) Substiute the values of s and t to determine the average speed.

    A. ABCD
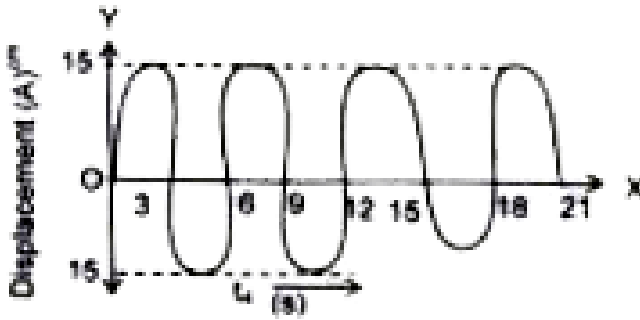
    B. ACDB

    C. DABC

    D. CDAB

Answer: A

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7. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure.

Then

Time period of the pendulum bob is _____ s.
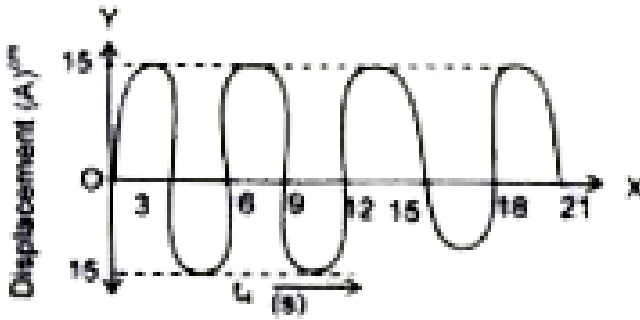
A. 3

B. 4

C. 2

D. $3\frac{1}{2}$

Answer: D

> ▶ Watch Video Solution

8. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure.

Then

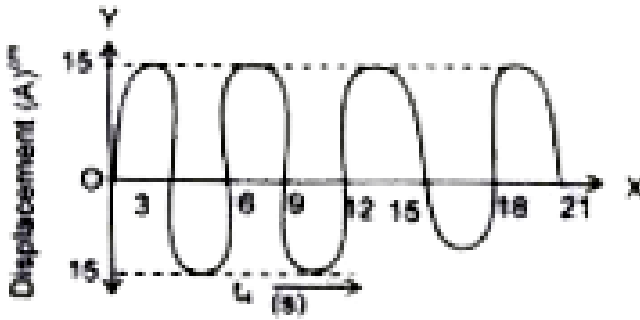Time period of the pendulum bob is _____ s.

A. 15

B. 5

C. 2.5

D. 7.5

Answer: A

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9. In the case of a simple pendulum, a graph is drawn between the displacement and time taken for its oscillations as shown in the figure.

Then

Time period of the pendulum bob is _____ s.

A. $1/6$

B. $1/3$

C. $1/9$

D. 1

Answer: A

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10. An electric fnas rotates 100 times in 50s . If the blength of its wing from its axis of rotation is 0.5 m, then the speed of particle at the edge of

the wing is _____ ms^{-1}

A. 2π

B. 0.5π

C. π

D. 2

Answer: A

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11. The ratiro of unit of accceleration and velocity gives unit of the physical quantity _____
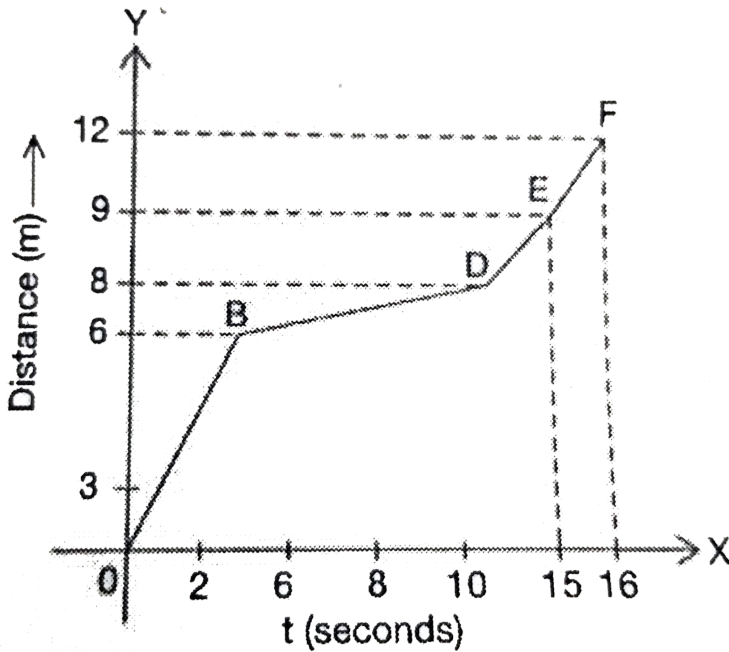
A. time

B. frequency

C. amplitude

D. speed

Answer: B

12. Motion of a body is depicted graphically as shown in the figure. The average speed of the body is _____ ms^{-1}

A. $3/4$

B. $9/8$

C. $4/3$

D. $8/9$

Answer: A

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13. An object moves the first half of the total distance with a speed of 2 m s^{-1} . If the average of the body is $3ms^{-1}$, the speed of the body when it travelles the remaining distance is _____ ms^{-1}

A. 3

B. 6

C. 4

D. 2

Answer: B

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14. Match the following

	Column A		Column B
(A)	Rest and motion	(a)	A car taking a turn
(B)	Oscillatory and periodic	(b)	Relative
(C)	Translatory and rotatory	(c)	Motion of the bob of a simple pendulum
(D)	Variable velocity	(d)	Motion of the wheels of a bicycle in motion

A. $A \rightarrow b, B \rightarrow c, C \rightarrow d, D \rightarrow a$

B. $A \rightarrow b, B \rightarrow c, C \rightarrow d, D \rightarrow d$

C. $A \rightarrow c, B \rightarrow b, C \rightarrow d, D \rightarrow a$

D. $A \rightarrow a, B \rightarrow c, C \rightarrow b, D \rightarrow d$

Answer: A

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Assessment Test Test 2 Select The Correct Alternative

1. Choose the correct statement.

A. Every oscillatory motion is periodic in nature.

B. Every periodic motion is oscillatory in nature.

C. The motion of a pendulum bob is periodic in nature (within its

small amplitude).

D. Both (a) and (c)

Answer: D

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2. Choose the correct statement.

A. Unit of acceleration is m s^{-2}.

B. Speed = distance/time.

C. Magnitude of displacement made by a body is less than or equal to the distance travelled by the body.

D. All of the above

Answer: D

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3. Assertion (A): Quartz clocks are more accurate than pendulum clocks.

Reason (R): Quartz clocks use periodic motion of simple pendulum for the measurement of time.

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true, but is not the correct explanation of A.

C. A is true but R is false.

D. Both A and R are false.

Answer: C

4. Assertion (A): The acceleration of a body moving with constant velocity is zero.

Reason (R): Acceleration is the rate of change in velocity.

    A. Both A and R are true and R is the correct explanation of A.

    B. Both A and R are true, but is not the correct explanation of A.

    C. A is true but R is false.

    D. Both A and R are false.

Answer: A

5. The time period of a simple pendulum is 4 s and the acceleration due to gravity at the given place is $9.8 ms^{-2}$. Write the following steps in sequential order to find the length of the pendulum.

(A) From the above formula, write the value of I and $l = \dfrac{T^2 \cdot g}{4\pi^2}$

(B) Note the given values of the time period (T) and acceleration due to gravity (g).

(C)Write the formula, $T = 2\pi\sqrt{\dfrac{l}{g}}$, where I is the length of the pendulum.

(D). Substitute the given data and get the value of l.

A. CDBA

B. ABCD

C. BCAD

D. ADBC

Answer: C

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6. A car starts from and attains a velocity of 54 km h^{-1} if the acceleration of the car is from rest and attains a velcoity of 54 km h^{-1} . If the

acceleration of the car is $3ms^{-2}$, write the following steps in sequential order to find the time taken to accelerate the car.

(A) Write the relation between u,v,a and t, where t is the time taken to accelerae the car.

(B) Note the final velocity (v) and convert it into SI unit.

(D) substitute the given values and obtain the vlaue of t using $t = \dfrac{v - u}{a}$
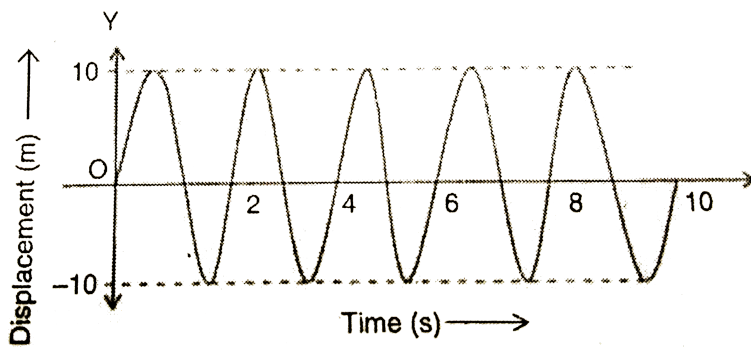
A. ADBC

B. ABCD

C. CADB

D. CBAD

Answer: D

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7. A graph is drawn between the displacement and time taken for the oscillations of a simple pendulum.find the no of oscillation?
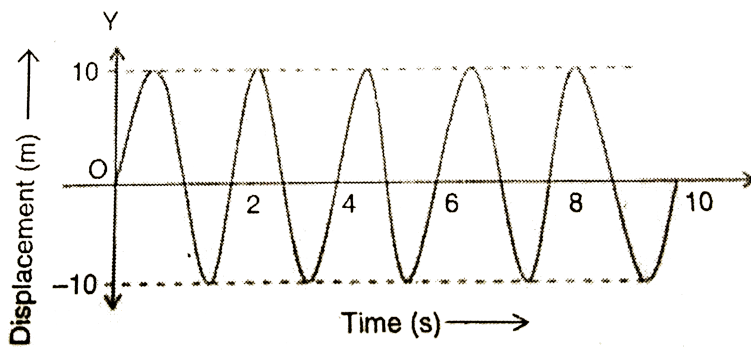
A. $4\frac{1}{2}$

B. 5

C. 6

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

Answer: B

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8. A graph is drawn between the displacement and time taken for the oscillations of a simple pendulum.find the no of oscillation?
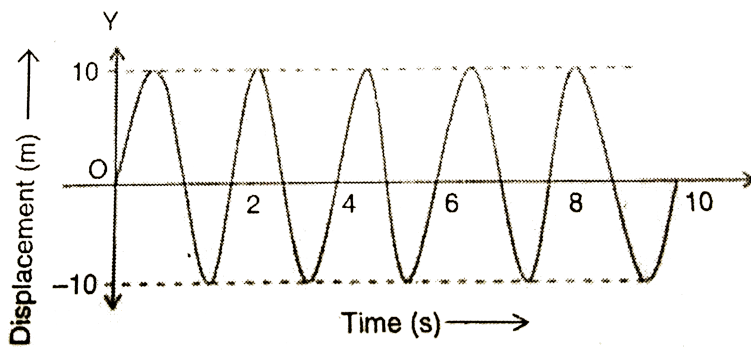
A. 2

B. 1

C. 0.5

D. 0.25

Answer: B

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9. A graph is drawn between the displacement and time taken for the oscillations of a simple pendulum.find the no of oscillation?

Time (s) ——→

A. 0.5

B. 2

C. 50

D. 100

Answer: A

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10. An electric motor winds 200 turns of a thin coper wire on a unifrom of

diameter 10 cm, in 2 seconds.then the length of the wire that is wound

over the rod in one second is _____ m.
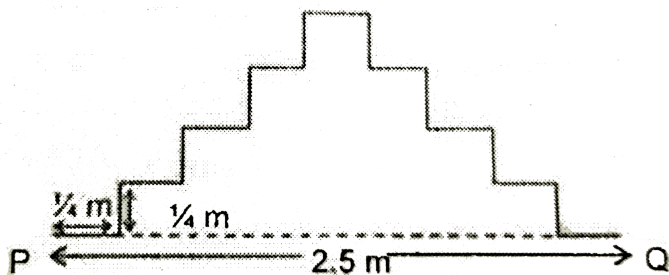
A. 30

B. 10π

C. 20π

D. None of these

Answer: B

---

11. An ant moves along the identical steps from P to Q as shown in the figure in a figure in a duration of 8.5 seonds. Then the speed and velocity of the ant respectively are ____ m s^{-1} and _ _ _ ms^{-1}

_____ m s^{-1} and _____ m s^{-1}

A. $0.5, \dfrac{4.5}{14}$

B. $0.5, 0.5$

C. $\dfrac{5}{17}, \dfrac{4.5}{17}$

D. Cannot be determined

Answer: A

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12. $T = 2\pi \sqrt{\dfrac{l}{g}}$ is the time period of a simple pendulum, then the unit of

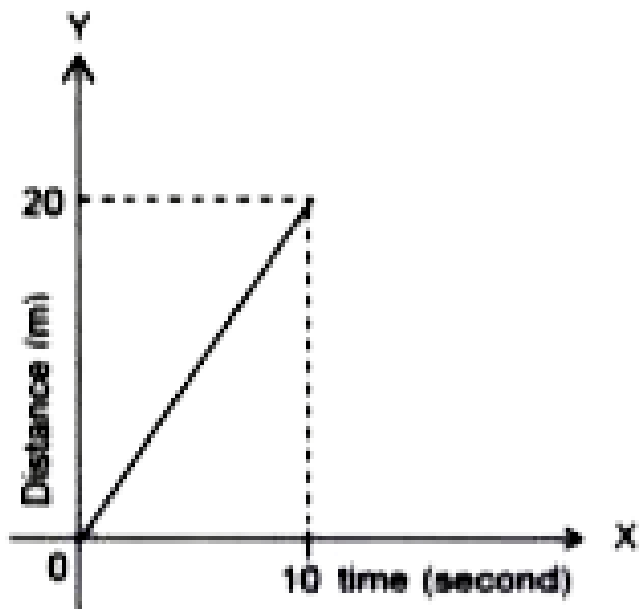$4\pi^2 \dfrac{l}{T^2}$ in SI system is _____ .

A. ms^{-1}

B. s^{-2}

C. ms^{-2}

D. s^{-1}

Answer: C

13. The motion of a body is depicted graphically as shown in the given figure. Then

A. 2

B. zero

C. 200

D. 20

Answer: A

14. A vechicle travels along a straight path between two places α and β. It travels first half of the distance with a velocity of 72 km h^{-1} and the remaining distance with a velocity of 36 km h^{-1} then the average velocity of the vehicle is _____ ms^{-1}

A. 11.3

B. 13.3

C. 15

D. 14

Answer: B

	Column A		Column B
(A)	A body covers 5 m in every subsequent second.	(a)	Lunar month
(B)	Equal distances in unequal intervals of time	(b)	Non-uniform speed
(C)	Periodic motion of the moon around the earth	(c)	Years
(D)	Appropriate unit to express the age of a person	(d)	Constant speed

15.

A. $A \to b, B \to c, C \to d, D \to a$

B. $A \to d, B \to b, C \to a, D \to c$

C. $A \to d, B \to a, C \to b, D \to c$

D. $A \to a, B \to b, C \to c, D \to d$

Answer: B

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