# EXERCISE

## OBJECTIVE QUESTIONS

**1.** The SI unit of length is :

(A) kelvin
(B) metre
(C) ohm
(D) centimetre

**2.** Speedometer measures

(A) speed
(B) average speed
(C) instantaneous speed
(D) instantaneous velocity

**3.** The area of rectangle is given as the product of length:

(A) breadth
(B) side
(C) volume
(D) none of these

**4.** 1 dm is equal to :

(A) 1/10 m
(B) 1/100 m
(C) 100 m
(D) none of these

**5.** 1 $cm^3$ = _____ $m^3$

(A) $10^{-6}$ (B) $10^{-3}$
(C) $10^{9}$ (D) $10^{6}$

**6.** What is the correct ascending order ?

(A) 1cm, 1dam, 1dm, 1m
(B) 1cm, 1dam, 1m, 1dm
(C) 1m, 1dm, 1cm,1dam
(D) 1cm, 1dm, 1m, 1dam

**7.** Motion of the pendulum is :

(A) Linear (B) Circular
(C) Rotational (D) Oscillatory

**8.** Motion of the stone dropped under gravity :

(A) Linear (B) Circular
(C) Rotational (D) Vibrational

**9.** Motion of the point on blade of a moving fan :

(A) Linear (B) Circular
(C) Oscillatory (D) Vibrational

**10.** Motion which repeats itself after a regular interval of time :

(A) Periodic (B) Non Periodic
(C) Rotational (D Vibrational

## SUBJECTIVE QUESTIONS

**1.** Why handspan and cubit or footstep can't used as standard unit?

**2.** Distinguish between the state of rest and motion.

**3.** What are the types of motion?

**4.** Discuss the used of divider.

**5.** State the importance of measurements.

## ANSWER KEY

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1.** | B | **2.** | C | **3.** | A | **4.** | A |
| **5.** | A | **6.** | D | **7.** | D | **8.** | A |
| **9.** | B | **10.** | A | | | | |

## Exercise - II OLYMPIAD PROBLEMS

1. WHich of the following types of motion is not exhibited by the earth moving around the sun?
(A) Circular (B) Rotational
(C) Rectilinear (D) Periodic

2. The girth of a tree can be measured by using a:
(A) Plastic rular (B) Metre scale
(C) netre rod (D) Measuring tape

3. WHich of the following modes of transport is not based on the invention of wheel?
(A) Bullock cart (B) Boat
(C) Bicycle (D) Bus

4. WHich of the following types of motion are possessed by a merry go round at the same time?
(i) Rotational (ii) Rectilinear motion
(iii) Periodic Motion (iv) Circular Motion
(A) (i) and (ii) (B) (ii) and (iii)
(C) (i) and (iii) (D) (i) and (iv)

5. A metre scale can measure lengths accuratey up to:
(A) 1 cm (B) 1 mm
(C) 1 Km (D) 1 m

6. Which of the following types of motion are possessed by a football rolling on the ground?
(i) Rotational Motion
(ii) Rectilinear motion
(iii) Circular Motion
(iv) Periodic Motion
(A) (i) and (ii) (B) (ii) and (iii)
(C) (i) and (iii) (D) (ii) and (iv)

7. The distance between Anuskha's home and Devika home is 1425 m. This distance is equal to
(A) 14.25 Km (B) 142.5 Km
(C) 1.425 Km (D) 0.1425 Km

8. A communication satellite us stational in an orbit high above the earth. Which of the fol lowing will not be exhibited by this communi cation satellite?
(i) Rotational Motion (ii) Periodic Motion
(iii) Circular Motion (iv) Rectilinear Motion
(A) (i) and (ii) (B) (ii) and (iii)
(C) (i) and (iv) (D) (ii) and (iv)

9. The Most concenient unit for measuring the thickness of a coin is
(A) Centimetre (B) Kilometre
(C) Metre (D) Millimetre

10. A bicycle is moving on a straight road. Which of the following types of motion are exhibited by it?
(i) Periodic motion (ii) Rotational Motion
(iii) Rectilinear Motion
(iv) Circular Motion
(A) (i) and (ii) (B) (ii) and (iii)
(C) (iii) and (iv) (D) (i) and (iv)

11. The height of a man is 1.56 m. This height is equal to
(A) 1560mm (B) 156mm
(C) 15.6 mm (D) 1560 cm

12. One of the foolowing types of motion will not be exhibited by the moon moving around the earth. This one is
(A) Rotational (B) Rectilinear
(C) Circular (D) Periodic

13. WHich one of the following is the smallest unit of length?
(A) Km (B) mm
(C) cm (D) m

14. The tip of the seconds hand of a clock is coloured red. WHich of the following types of motion will be exhibited by the red coloured tip of the second hand of this clock
(i) Rotational Motion (ii) Periodic Motion
(iii) Circular Motion (iv) Rectilinear Motion
(A) (i) and (ii) (B) (i) and (iii)
(C) (ii) and (iii) (D) (iii) and (iv)

## ANSWER KEY

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1.** | C | **2.** | D | **3.** | B | **4.** | D |
| **5.** | B | **6.** | A | **7.** | C | **8.** | C |
| **9.** | D | **10.** | B | 11. | A | 12. | B |
| 13. | B | 14. | C | | | | |

## Exercise - III PRACTICES PROBLEMS

### SECTION -A

**Fill in the following blanks with suitable words:**

**(i)** The length of forearm from elbow to finger tips is called.....

(ii) Every measurement consists of a number and a .....

(iii) THe change is position of an object with time is called.....

(iv) A falling stone exhibits.....motion

(v) One metre is .....mm

### SECTION-B

**Short Answer Types Questions**

1. Explain why, hand-span cannot be used as a standard unit of lenght.
2. WHat is cubit? Explain why cunit cannot be used as a standard unit of lenght
3. WHy a foot step cannot be used as a standard unit of lenght?
4. Write the full names of the following units of measurement
   (a) cm (b) km (c) mm (d) m
5. Write the abbreviations for the following units
   (a) centimetre (b) metre (c) Kilometre (d) Millimetre
6. What is meant by rectilinear motion? Given two examples of rectilinear Motion.
7. What is periodic motion? State two examples of periodic or rotational motion.
8. Name the two modes of transport used
   (a) on land (b) in water (c) by air

## ANSWER KEY

### SECTION - A

**1. (i) Cubic (ii) Unit (iii) Motion (iv) rectilinear**
**(v) 1000**

## Exercise - IV FOUNDATION LEVEL PROBLEMS

**Q.1.** A runner completes one round of a circular path of radius r in 40 seconds. His displacement after 2 minutes 20 seconds will be

[1] zero [2] $2\pi r$

[3] $2r$ [4] $7\pi r$

**Q.2.** An old man goes for morning walk on a semicircular track of radius 40 m; if he starts from one end of the track and reaches to other end, the distance covered by the man and his displacement will respectively be

[1] 126 m, 80 m [2] 80 m, 126 m

[3] 80 m, 252 m [4] 252 m, 80 m

**Q.3.** A body covered a distance of L m along a curved path of a quarter circle. The ratio of distance to displacement is

[1] $\frac{\pi}{2\sqrt{2}}$ [2] $\frac{2\sqrt{2}}{\pi}$

[3] $\frac{\pi}{\sqrt{2}}$ [4] $\frac{\sqrt{2}}{\pi}$

**Q.4.** A passenger travels along a straight line with velocity $v_1$ for first half time and with velocity $v_2$ for next half time, then the mean velocity v is given by

[1] $v = \frac{v_1 + v_2}{2}$ [2] $v = \sqrt{v_1 v_2}$

[3] $v = \sqrt{\frac{v_2}{v_1}}$ [4] $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

**Q.5.** A car covers a distance of 2 km in 2.5 minute, if it covers half of the distance with speed 40 km/hr, the rest distance it will cover with speed

[1] 56 km/hr [2] 60 km/hr

[3] 50 km/hr [4] 48 km/hr

**Q.6.** A bicyclist encounters a series of hills. Uphill speed is always $v_1$ and downhill speed is always $v_2$. The total distance travelled is $\ell$, with uphill and downhill portions of equal length. The cyclist's average speed is

[1] $\frac{v_1}{v_2}$ [2] $\frac{v_2}{v_1}$

[3] $\frac{v_1 v_2}{v_1 + v_2}$ [4] $\frac{2v_1 v_2}{v_1 + v_2}$

**Q.7.** A motor car covers $\frac{1}{3}$rd part of total distance with $v_1 = 10 km/hr$, second $\frac{1}{3}$rd part with $v_2 = 20$ km/hr and rest $\frac{1}{3}$rd part with $v_3 = 60 km/hr$. What is the average speed of the car?

[1] 18 km/hr [2] 45 km/hr

[3] 6 km/hr [4] 22.5 km/hr

**Q.8.** The displacement-time graph for the two particles A and B are straight lines inclined at angles $30^0$ and $60^0$ with the time axis. The ratio of the velocities of A to B will be

[1] 1 : 2 [2] $1:\sqrt{3}$

[3] $\sqrt{3}:1$ [4] 1 : 3

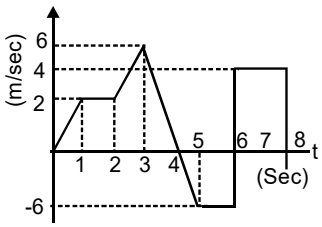
**9.** The velocity-time graph of a body is shown in figure. The displacement covered by the ody in 8 seconds is

[1] 10 m

[2] 9 m

[3] 24 m

[4] 30 m



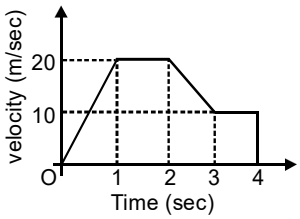

**10.** The variation of velocity of a particle moving along straight line is shown in figure. The distance traversed by the body in 4 seconds is

[1] 70 m

[2] 60 m

[3] 40 m

[4] 55 m



**11.** The displacement y (in metres) of a body varies with time (in seconds) according to the equation $y = -\frac{2}{3}t^2 + 16t + 2$. How long does the body come to rest?

[1] 8 seconds [2] 10 seconds
[3] 12 seconds [4] 14 seconds

**12.** If y denotes the displacement and t denotes the time and the displacement is given by $y = a\sin\omega t$, the velocity of the particle is

[1] $a\cos\omega t$ [2] $-a\cos\omega t$

[3] $a\omega\cos\omega t$ [4] $\frac{(a\cos\omega t)}{\omega}$

**13.** A truck travelling due to North at 20 m/s turns East and travels at the same speed. The change in its velocity is

[1] $20\sqrt{2}\,m/s\,North-East$

[2] $20\sqrt{2}\,m/s\,South-East$

[3] $40\sqrt{2}\,m/s\,North-East$

[4] $20\sqrt{2}\,m/s\,North-West$

**14.** Which one of the following equations represent the motion of a body with finite constant acceleration. In these equations y denotes the displacement of the body at time t and a,b and c are the constant of the motion

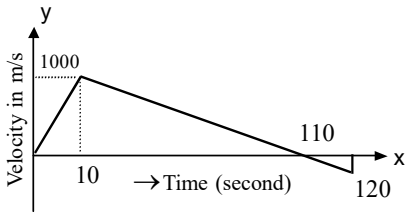
[1] $y = \frac{a}{t} + bt$ [2] $y = at$

[3] $y = at + bt^2$ [4] $y = at + bt^2 + ct^3$

**15.** A car moving at 12 m/s due east attains a speed 16 m/s towards north in 4 seconds. The magnitude of its average acceleration in $m/s^2$ is

[1] 1 $m/s^2$ [2] 3 $m/s^2$
[3] 5 $m/s^2$ [4] 7 $m/s^2$

**16.** Adjacent graph shows the variation of velocity of a rocket with time. Find the time of burning of fuel from the graph



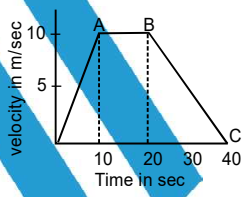

[1] 10 sec

[2] 110 sec

[3] 120 sec

[4] cannot be estimated from the graph

**17.** The adjoining curve represents the velocity-time graph of a particle, its acceleration values along OA, AB and BC in metre/$sec^2$ are respectively




[1] 1,0,–0.5

[2] 1,0,0.5

[3] 1,1,0.5

[4] 1,0.5,0

**18.** A car travels first 1/3 of the distance AB at 30 km/hr next 1/3 of the distance at 40 km/hr, last 1/3 of the distance at 24 km/hr. Its average speed in km/hr for the whole jouney is

[1] 40 [2] 35 [3] 30 [4] 28

**19.** A particle travels A to M along a straight line with a velocity of 8 m/s and M to A with a velocity of 2 m/s, then the average velocity for the whole journey is

[1] 3.2 m/s [2] –5 m/s
[3] –3.2 m/s [4] 0 m/s

**20.** An object will continue accelerating untill

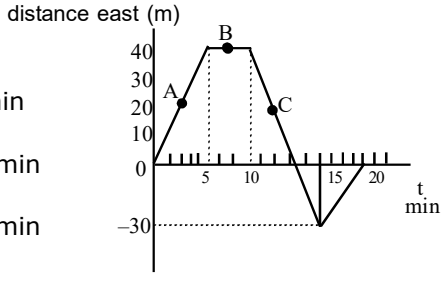
[1] the resultant force on it begins to decrease

[2] the velocity changes direction

[3] the resultant force on it is zero

[4] the resultant force is at right angles to its direction of motion

**21.** A girl walks along an east-west street, and a graph of her displacement from home is as shown in figure. Her average velocity for the whole time intervals is




[1] zero

[2] 6 m/min

[3] 11 m/min

[4] 15 m/min

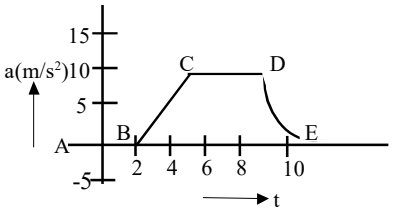
**22.** The uniform motion in the following acceleration time graph is

[1] AB

[2] BC

[3] CD

[4] DE




**23.** The displacement-time relationship for a particle is given by $x = a_0 + a_1t + a_2t^2$. The acceleration of the particle is

[1] $a_0$ [2] $a_1$

[3] $a_2$ [4] $2a_2$

**24.** A particle travels for 40 seconds under the influence of a constant force. If the distance travelled by the particle is $S_1$ in the first twenty seconds and $S_2$ in the next twenty seconds, then

[1] $S_2 = S_1$ [2] $S_2 = 2S_1$
[3] $S_2 = 3S_1$ [4] $S_2 = 4S_1$

**25.** A particle moves with constant acceleration for 6 seconds after starting from rest. The distance travelled during the consecutive 2 seconds interval are in the ratio

[1] 1 : 1 : 1 [2] 1 : 2 : 3
[3] 1 : 3 : 5 [4] 1 : 5 : 9

**26.** A body having initial velocity u is moving with uniform acceleration a. The distance covered by it in $n^{th}$ second is

[1] $u+\frac{a}{2}(2n+1)$ [2] $u-\frac{a}{2}(2n-1)$

[3] $u-\frac{a}{2}(2n+1)$ [4] $u+\frac{a}{2}(2n-1)$

**27.** A ball is thrown upward and reaches a height of 64 feet, its initial velocity should be (g = 32 ft/sec²)

[1] 64 ft/sec [2] 72 ft/sec
[3] 32 ft/sec [4] 4096 ft/sec

**28.** Two bodies of different masses $m_a$ and $m_b$ are dropped from two different heights, viz a and b. The ratio of times taken by the two to drop through these distance is

[1] a : b [2] $\frac{m_a}{m_b} : \frac{b}{a}$

[3] $\sqrt{a} : \sqrt{b}$ [4] $a^2 : b^2$

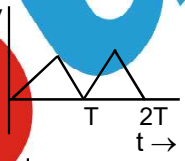
**29.** A stone weighing 10 kg is dropped from a cliff in a high wind. The wind exerts a steady horizontal force of 50 N on the stone as it falls. The path that the stone follows will be

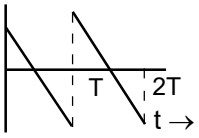
[1] A parabola
[2] An ellipse
[3] A more complicated path
[4] A straight line

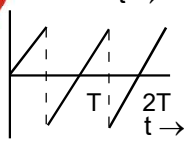
**30.** A body thrown up with a finite speed is caught back after 4 sec. The speed of the body with which it is thrown up is

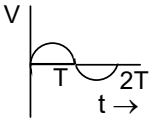
[1] 10 m/sec [2] 20 m/sec
[3] 30 m/sec [4] 40 m/sec

**31.** A ball is dropped from certain height on a glass floor so that it rebounds elastically to the same height. If the process continues, the velocity-time graph for such a motion would be

[1] 


[2] 


[3] 


[4] 


**32.** A stone is thrown vertically upwards with an initial velocity of 30 m/s. The time taken for the stone to rise to its maximum height is

[1] 0.326 s [2] 3.26 s
[3] 30.6 s [4] 3.06 s

**33.** A body is thrown upward and reaches its maximum height. At that position

[1] its velocity is zero and its acceleration is also zero

[2] its velocity is zero but its acceleration is maximum

[3] its acceleration is minimum

[4] its velocity is zero and its acceleration is the acceleration due to gravity

**34.** The initial velocity of a particle (at t = 0) is u and the acceleration of particle at time t is given by f = at. Where a is a constant which of the

following relation for velocity v of particle after time t is true?

[1] $v = u + at^2$ [2] $v = u + at^2/2$
[3] $v = u + at$ [4] none of these

**35.** A man is walking on a road with a velocity 3 km/hr. Suddenly rain starts falling. The velocity of rain is 10 km/hr in vertically downward direction. The relative velocity of the rain is

[1] $\sqrt{13}\,km/hr$ [2] $\sqrt{7}\,km/hr$

[3] $\sqrt{109}\,km/hr$ [4] 13 km/hr

**36.** A boat P is moving at 40 km/hr and another boat Q is moving at 20 km/hr. Which one of the following is not a possible value for their relative velocity

[1] 10 km/hr [2] 20 km/hr
[3] 30 km/hr [4] 40 km/hr

**37.** The position of a body with respect to time is given by $x = 4t^3 - 6t^2 + 20\,t + 12$. Acceleration at t = 0 will be

[1] –12 units [2] 12 units
[3] 24 units [4] –24 units

**38.** A body travels 200 cm in the first two seconds and 220 cm in the next four second. The velocity at the end of the seventh second from the start will be

[1] 10 cm/s [2] 5 cm/s
[3] 15 cm/s [4] 20 cm/s

**39.** A man standing on a road hold his umbrella at $30^0$ with the vertical to keep the rain away. He throws the umbrella and starts running at 10 km/h. He finds that raindrops are hitting his head vertically, the speed of rain drop with respect to the road will be

[1] 10 km/h [2] 20 km/h
[3] 30 km/h [4] 40 km/h

**40.** The linear momentum of a body is p. The linear momentum p varies with time. The equation for variation is $p = a + bt^2$ where a and b are constants. The effective force acting on the body is

[1] proportional to $t^2$ [2] constant
[3] proportional to t
[4]inversely proportional to t

**41.** The acceleration of a particle increases linearly as bt with time. If the particle starts from $v_0$ as initial velocity then the distance travelled in t seconds will be

[1] $v_0t + \frac{1}{6}bt^3$ [2] $v_0t - \frac{1}{6}bt^2$

[3] $v_0t - \frac{1}{6}bt^3$ [4] $v_0t + \frac{1}{2}bt^3$

**42.** A particle has velocity given by $v = 20 + 0.1\,t^2$ then it has

[1] uniform acceleration
[2] uniform retardation
[3] non uniform acceleration
[4] zero acceleration

**43.** A body starting from rest and has uniform acceleration 8 $m/sec^2$. The distance travelled by it in 5th second will be

[1] 36 m [2] 40 m
[3] 100 m [4] 200 m

**44.** A body starts from rest, the ratio of distances travelled by the body during 3rd and 4th seconds is

[1] 7/5 [2] 5/7
[3] 7/3 [4] 3/7

**45.** A body sliding on a smooth inclined plane requires 4 sec to reach the bottom after starting from rest at the top. How much time does it take to cover one fourth the distance starting from the top

[1] 1 sec [2] 2 sec
[3] 0.4 sec [4] 1.6 sec

**46.** The initial velocity of a particle is 10 m/sec and its retardation is 2 $m/sec^2$. The distance covered in the fifth second of the motion will be

[1] 1 m [2] 19 m
[3] 50 m [4] 75 m

**.47.** A particle is moving east-wards with a velocity of 5m/sec. In 10 seconds its velocity changes to 5m/sec north-wards. The average acceleration during this time is

[1] $\frac{1}{\sqrt{2}}\,m/sec^2$ in N-W direction

[2] $\frac{1}{\sqrt{2}}\,m/sec^2$ in the N-E direction

[3] $\frac{1}{2}$ $m/sec^2$ in N-W direction

[4] $\frac{1}{2}$ $m/sec^2$ towards east

**48.** A ship of mass $3 \times 10^7$ kg initially at rest, is pulled by a force of $5 \times 10^4$ N through a distance of 3m. Assuming that the resistance due to

water is negligible, the speed of the ship is

[1] 1.5 m/sec [2] 60 m/sec

[3] 0.1 m/sec [4] 5 m/sec

**49.** A particle moves with a constant acceleration such that in the successive time intervals $t_1$, $t_2$ and $t_3$ its average velocities are $v_1$, $v_2$ and $v_3$. The ratio of $v_1 - v_2$ and $v_2 - v_3$ is

[1] $t_1 - t_2 : t_2 + t_3$ [2] $t_1 + t_2 : t_2 + t_3$

[3] $t_1 - t_2 : t_2 - t_3$ [4] $t_1 - t_2 : t_2 - t_3$

**50.** A car travels from place A to the place B at 20 km/hour and returns at 30 km/hour. The average speed of the car for the whole journey is

[1] 25 km/hour [2] 24 km/hour

[3] 50 km/hour [4] 5 km/hour



## ANSWER KEY

| Qus. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | 3 | 1 | 1 | 1 | 2 | 4 | 1 | 4 | 2 | 4 | 3 | 3 | 2 | 3 | 3 |
| Qus. | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | 1 | 1 | 3 | 4 | 3 | 1 | 1 | 4 | 3 | 3 | 4 | 1 | 3 | 4 | 2 |
| Qus. | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| Ans. | 3 | 4 | 4 | 2 | 3 | 1 | 1 | 1 | 2 | 3 | 1 | 3 | 1 | 2 | 2 |
| Qus. | 46 | 47 | 48 | 49 | 50 | | | | | | | | | | |
| Ans. | 1 | 1 | 3 | 2 | 2 | | | | | | | | | | |