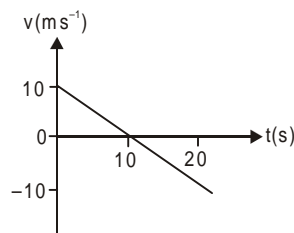


ASSIGNMENT

- Q.1** Define Instantaneous velocity.
- Q.2** What is average velocity ?
- Q.3** What is the significance of the slope of x-t graph ?
- Q.4** Write two uses of v-t graph ?
- Q.5** Define acceleration.
- Q.6** What is the ratio of SI to CGS unit of acceleration ?
- Q.7** What does speedometer of a car indicate ?
- Q.8** When a body accelerates by αt , what is the velocity after time 't', when it starts from rest ?
- Q.9** Write the expression for distance covered in n^{th} second by a uniformly accelerated body.
- Q.10** Two masses in the ratio 1 : 2 are thrown vertically up with the same speed. What is the effect on the time by the mass ?
- Q.11** What can you say about the nature of acceleration, associated with a mass whose v-t graph is shown ?



- Q.12** A car starts accelerating from rest for sometime, maintains the velocity for sometime and then comes to rest with uniform deceleration. Draw the v-t graph.
- Q.13** A car moving at a speed of 10m/s is accelerated at the rate of 2 m/s^2 . Find out the velocity after 6 sec.
- Q.14** A car is moving at a speed of 60 km/h is accelerated at the rate of 10 km/h^2 . How much will be the distance covered by the car in 3 hours ?
- Q.15** Two bodies of different masses m_1 and m_2 are dropped from two different heights 'a' and 'b'. What is the ratio of time taken by the two to drop through these distances ?
- Q.16** A body starts from rest and moves along a straight line. It has uniformly accelerated motion upto time t_1 . During the interval $t_2 - t_1$ it moves with uniform velocity. After time t_2 its motion is retarded, and it comes to rest at time t_2 . Draw the velocity time graph.

- Q.17** Two balls of different masses are thrown vertically upwards with same initial speed. Which one will rise to the greater height ? Which of the two will come back with greater speed to the point of projection ?
- Q.18** Derive the relation, $v^2 = u^2 + 2as$ where the symbols carry usual meaning.
- Q.19** Two cars A and B are running at velocities of 60 km/hr and 45 km/hr. respectively. Calculate the relative velocity of car A if :
- They are both travelling eastwards; and
 - Car A is travelling eastwards and car B is travelling westwards.
- Q.20** A player throws a ball upwards with an initial speed of 39.2 ms^{-1} .
- What is the direction of acceleration during the upward motion ?
 - Find the velocity and acceleration of the ball at the highest point.
 - Find the height through which the ball rises, and the time after which it returns to the player's hands.
- Q.21** Categorises the following cases as 1-D, 2-D or 3-D.
- Flight of a shuttle cock
 - Fall of an apple from a tree.
 - Walking on a straight road
 - Fired bullet
 - Gear handle of a vehicle
 - Molecular motion.
- Q.22** The distance x -travelled by a body in a straight line is directly proportional to t^2 . Decide on the type of motion associated. If $x \propto t^3$ what change will you observe ?
- Q.23** A car covers the first half of the distance between two places at a speed of 40 kmh^{-1} and second half at 60 kmh^{-1} . Calculate the average speed of the car.
- Q.24** A car travelling at a speed of 10 m/s due North, turns to its left and travels with same speed. Find the change in velocity associated.
- Q.25** A cyclist covers first half of a length with a speed of 5 m/s and the second half with a speed of 10 m/s . What is the average speed of the cyclist ?
- Q.26** A body covers 200 cm in the first 2 seconds and 220 cm in the next two seconds. What will be its velocity at the end of 7 seconds ? Also, find the displacement in 7 seconds ?
- Q.27** A car starting from rest, accelerates uniformly with 5 m/s^2 for sometime and then decelerates to come to rest with 3 m/s^2 . find the maximum velocity attained during the motion and the distance covered in a total time of 6 seconds of the journey.
- Q.28** A boy throws a ball vertically upwards with a velocity of 9.8 m/s from the roof of a building 20 m high. How long will the ball take to reach the ground ? What will be its velocity when it strikes the ground ?
- Q.29** What do you mean by uniform angular velocity ?
- Q.30** If both speed of a body and radius of the circular path are doubled, what will be the change in centripetal force ?
- Q.31** If two bodies have circular path of radius r_1 and r_2 and the time taken are the same find the ratio of the angular speed.

- Q.32** Give two applications and two examples of projectile motion.
- Q.33** A cyclist starts from the centre O of a circular track of radius 1 km, reaches the edge P of the park, then cycles along the circumference and returns to the centre along O as shown. If the round trip takes 10 min. what is the
(a) Net displacement, (b) average velocity, (c) average speed of the cyclist ?
- Q.34** What is the angular acceleration of a particle moving in a circle of radius 'r' with angular speed ' ω ' ?
- Q.35** Two bombs of 20 kg and 30 kg are thrown from a cannon with the same velocity in the same direction. Which bomb will reach the ground first ?
- Q.36** If the time of flight of a projectile projected with a velocity u at an angle θ is $\frac{2u \sin \theta}{g}$, find the condition for maximum range and its value ?
- Q.37** Derive a relation for the time taken by a projectile to reach the highest point and the maximum height attained ?
- Q.38** Define the terms resultant and equilibrium of two forces. Two forces F_1 and F_2 acting at an angle θ on a body simultaneously have a resultant F . Show that

$$\theta = \cos^{-1} [(F^2 - F_1^2 - F_2^2) / 2F_1 \cdot F_2]$$
- Q.39** The total speed V_1 of a projectile at its greatest height is $\sqrt{\frac{6}{7}}$ of its speed V_2 when it is at half its greatest height. Show that the angle of projection is 30° .
- Q.40** A base ball is hit at an angle 45° and at a height of 0.9 m. The ball travels a total distance of 120m. What is the initial velocity of the ball ? What is the height of the ball above a 3m fence 100m from where the ball is hit ?
- Q.41** A motorcycle stunt rider will jump a 100 m wide row of cars. The launch ramp is 30° and 9.0 m high. the land ramp is also 30° and is 6m high. Find the minimum speed for the launch.
- Q.42** The kinetic energy associated with a mass m moving in a circular path is given by $K.E. = as^2$ where a is a constant and s is the distance travelled. Find the accelerations associated with the body.
- Q.43** A body is suspended by a string of length 1m and is projected horizontally with velocity 4 m/s. Calculate the tangential and radial accelerations when the string rises by 60° from its initial position. Also find the difference in velocity.
- Q.44** A body falling freely from a height H hits an inclined plane in its path at a height h . Due to the impact, (elastic) the direction of the velocity of the body becomes horizontal. Find h/H , so that the body takes maximum time to reach the ground.

ENGLISH HINDI TRANSLATION

1.	Mechanics	यांत्रिकी
2.	Kinematics	पिण्ड की गति
3.	Dynamics	गतिकी
4.	Distance	दूरी
5.	Displacement	विस्थापन
6.	Speed	चाल
7.	Velocity	वेग
8.	Instantaneous velocity	तात्क्षणिक वेग
9.	Average velocity	औसत वेग
10.	Uniform velocity	एकसमान वेग
11.	Non-uniform velocity	असमान वेग
12.	Acceleration	त्वरण
13.	Uniform acceleration	एकसमान त्वरण
14.	Non-uniform acceleration	असमान त्वरण
15.	Projectile motion	परवलयिक गति
16.	Circular motion	वृत्तीय गति
17.	Range	परास
18.	Trajectory	पश्यपाथ
19.	Radius	त्रिज्या
20.	Path length	पथ लम्बाई
21.	Angular velocity	कोणीय वेग
22.	Linear velocity	रेखीय वेग
23.	Angular acceleration	कोणीय वेग
24.	Linear acceleration	रेखीय त्वरण
25.	Time of flight	उड़डयन काल
26.	Projection angle	प्रक्षेप कोण
27.	Relative motion	सापेक्षिक गति