Kinematics

Q1: Define Kinematics.

Ans: The branch of physics which deals with the study of motion an object without discussing the causes of motion.

Q2: Define Rest and Motion.

Ans:

Rest: If a body does not change its position with respect its surrounding it will be in rest. A lamp pole on road

Motion: If a body changes its position with respect to its surroundings it will be in motion. i.e., a moving car on the road

Q3:Write the name of types of motion.

Ans: There are three types of motion.

   i)   Translatory motion(linear, random and circular motion)
   ii)   Rotatory motion
   iii)   Vibratory motion.

Q4: Define two types of motion.

Ans:

Rotatory Motion: The spinning motion of a body about its axis is called rotatory motion. i.e., Motion of ceiling fan

Vibratory Motion: To and fro motion of a body about its mean position is known as vibratory motion. i.e., motion of a swing

Q5: What is mean by Circular motion?

Ans: The motion of an object in a circular path is known as circular motion .

Example: The motion of earth around sun.

Q6: Define Translatory motion and give an example.

Ans: Translatory motion is a type of motion in which a body moves along a line without any rotation. The line may be straight or curved.

Q7: Differentiate between linear motion and random motion.

Ans:

Linear motion: Straight line motion of a body is known as its linear motion. i.e., Car moving on straight line

Random motion: The disordered or irregular motion of an object is called random motion. i.e., motion of butter fly.

Q8:Differentiate between circular motion and rotatory motion.

Ans:

Rotatory Motion: The spinning motion of a body about its axis is called rotatory motion. i.e., motion of a top

Circular motion: The motion of an object in a circular path is known as circular motion. i.e., The motion of earth around sun.

Q9:Define Scalars quantities and give two examples.

Ans: Those physical quantities which are described completely by its magnitude only no direction required.

Examples: Mass, length , time , speed , volume, work and energy

Q10: Define Vectors and give examples.

Ans: Those quantities which are described completely by its magnitude as well as direction .

Examples: Velocity, Displacement , Force , Momentum and Torque etc

Q11:How is vector represented symbolically?

Ans: Symbolically vector is represented by bold letter.i.e.,**A,B**

Or vector can be represented by a bar or arrow over their symbols. i.e.,

$$\vec{A}\ \vec{B}$$

Q12: How is vector represented Graphically?

Ans: Graphically a vector can be represented by a line segment with an arrow head which represents its direction and the length of line segment gives its magnitude according to selected scale. AB is length of vector V and its direction is from A to B.

Q13: Why vector quantities cannot be added and subtracted like scalar quantities?

Ans: The quantities having direction cannot be added and subtracted like scalar quantities. Scalar quantities have no any direction but the vector quantities have direction.

Q14: Define position and give example.

Ans: Position means the location of a certain place or object from a reference point.

Example: In figure, the point 'P' represents the position of the with respect to origin O.

Q15: Differentiate between distance and displacement.

Ans:

Distance	Displacement
1. Length of a path between two points is called the	1. Displacement is the shortest distance between two

distance between those points	points which has magnitude and direction.
2. It is a scalar quantity.	2. It is a vector quantity.
3. It is represented by S.	3. It is represented by **d.**
4. Distance can be find by the formula. S=V x t	4. Displace can be find by the formula **d=v** x t

Q16: Define speed and write its formula and unit.

Ans: The distance covered by an object in unit time is called its speed . Speed is scalar quantity.

v= s/t

Unit: ms^{-1}

Q17: Convert $20ms^{-1}$ to Kmh^{-1}

Q18: Convert $50kmh^{-1}$ to ms^{-1}

Q19: Convert $36kmh^{-1}$ to meter per second.

Q20: A sprinter completes its 100 meter race in 12 s. Find his average speed.

Q21:Speed of a car is 72 kmh^{-1}. Convert this speed in ms^{-1}.

Q22: Differentiate between uniform and variable speed.

Ans:

Variable Speed	Uniform Speed
A body has variable speed if does not cover equal distance in equal intervals of time. However short the interval may be.	A body has uniform speed if it covers equal distances in equal intervals of time however short the interval may be.

Q23: Define Average Velocity and write its formula.

Ans: The change in total displacement with respect to total time is called average velocity.

Average Velocity= $\frac{Total\ Displacement}{Total\ time}$

Or $v_{av}=\frac{\Delta d}{\Delta t}$

Q24: Define velocity and write it equation.

Ans: The rate of change of displacement is called velocity.

Velocity= $\frac{Displacement}{time}$

Mathematically $V=\frac{d}{t}$

Unit of velocity: ms^{-1}

Q25: Define acceleration and write its SI unit.

Ans: The rate of change of velocity of a body is called acceleration.

Unit: ms^{-2}

Acceleration = $\frac{final\ velocity - Initial\ velocity}{Time}$

Q26: Define Uniform Acceleration write its unit.

Ans: A body has uniform acceleration if it has equal changes in velocity in equal intervals of time however shorter the interval may be.

Unit: ms^{-2}

Q27: What is retardation or deceleration?

Ans: The acceleration of a body whose velocity is decreasing is called deceleration or retardation or negative acceleration. Its direction is opposite to velocity.

Q28: Can a body moving at a constant speed have acceleration?

Ans: Yes a body moving at a constant speed has acceleration if the direction of motion is variable.

Example: A body moving in a circle with constant speed.

Q29: What is the difference between positive acceleration and negative acceleration?

Ans:

Positive Acceleration	Negative Acceleration
1. If the velocity of a body is increasing its acceleration will be positive.	1. If the velocity of body decreasing its acceleration will be negative.
2. It is always in the direction of velocity.	2. It is always in direction opposite to velocity.

Q30: Draw the graph of constant speed.

Q31: What would be the shape of a speed-time graph of a body moving with variable speed?

Q32: Write equations of motion for uniformly acceleration.

Q33: Define gravitational acceleration and write its value is SI units.

Ans: The acceleration of a freely falling bodies is called gravitational acceleration. It is denoted by g. Its value is $10ms^{-2}$

Q34: Write equations of motion under gravity.