

KENDRIYA VIDYALAYA SITAPUR (FIRST SHIFT)

Unit Test – 1 (Session 2022 – 2023)

Class – XI

Subject – Physics

Time – 90 minutes.

Set – 2

M.M. – 40

Note :

- 1) All questions are compulsory.
- 2) There are 20 questions in a paper divided into seven sections.
- 3) Section - A contain 4 questions of assertion reason based 1 mark each .
- 4) Section - B contain 2 questions of case study based 4 marks each .
- 5) Section - C contain 4 questions of MCQ based 1 mark each .
- 6) Section – D contain 4 very short questions 1 mark each .
- 7) Section – E contain 2 short questions 2 marks each .
- 8) Section – F contain 2 short questions 3 marks each.
- 9) Section – G contain 2 long questions 5 marks each.

Section – A

(ASSERTION – REASON BASED QUESTIONS)

For question numbers 1 to 4, two statements are given - one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

- 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) A is false and R is also false.

Q.1) Assertion (A) : The dimensions of work and torque are same.

Reason (R) : Both have dimensions $[ML^2T^{-2}]$.

Q.2) Assertion (A) : The trigonometric ratios are dimensionless quantity.

Reason (R) : Because they are the ratios of two sides.

Q.3) Assertion (A) : In javelin throw , the athlete throws the projectile at an angle slightly more than 45° .

Reason (R) : The maximum range does not depend upon angle of projection.

Q.4) Assertion (A) : Velocity is a scalar quantity.

Reason (R) : Scalar quantities have both magnitude and direction.

Section – B

CASE STUDY BASED QUESTIONS

Q.5) **SIGNIFICANT FIGURES** : Every measurement involves errors . Thus, the result of measurement should be reported in a way that indicates the precision of measurement . Normally , the reported result of measurement is a number that includes all digits in the number that are known reliably plus the first digit that is uncertain . The reliable digits plus the first uncertain digit are known as significant digits or significant figures.

1) All the non-zero digits are :

- (a) even (b) odd (c) significant (d) not significant

2) The number of significant figures in 237000 is :

- (a) 3 (b) 4 (c) 5 (d) 6

3) The length and breadth of a rectangle are 3.543 cm and 1.25 cm respectively . The number of significant figures in the area of rectangle will be :

- (a) 4 (b) 3 (c) 2 (d) 1

4) Subtract 4.27153 from 6.807 and express the result in appropriate number of significant figures will be :

- (a) 2.535 (b) 2.53547 (c) 2.5354 (d) 2.54

Q.6) **MOTION** : Motion is common to everything in the universe. We walk, run and ride a bicycle. Even when we are sleeping, air moves into and out of our lungs and blood flows in arteries and veins. We see leaves falling from trees and water flowing down a dam. Automobiles and planes carry people from one place to the other. The earth rotates once

every 24 hours and revolves around the sun once in a year. The sun itself is in motion in the Milky way, which is again moving within its local group of galaxies. Thus, motion is change in position of an object with time.

1) The study of motion of objects along a straight line is also known as :

- (a) kinematics (b) rectilinear motion (c) circular motion (d) optics

2) In kinematics , we study ways to describe motion :

- (a) without considering the causes of motion. (b) with considering the causes of motion.
(c) in a straight line. (d) in a plane.

3) When a body covers unequal distances in equal intervals of time , it is said to be in :

- (a) uniform motion (b) non-uniform motion (c) linear motion (d) vibratory motion

4) Example of uniformly accelerated motion is :

- (a) A car is moving on a crowded street.
(b) A person is jogging in a park.
(c) A free falling body.
(d) none of above.

Section – C

MULTIPLE CHOICE QUESTIONS

Q.7) The dimensions of momentum are :

- (a) $[ML^2T^{-2}]$ (b) $[ML^2T^2]$ (c) $[MLT^{-2}]$ (d) $[MLT^{-1}]$

Q.8) A particle moves along the x-axis . The position x of the particle with respect to time t from the origin is given by $x = p + 2qt + 3rt^2$. The instantaneous acceleration of particle is :

- (a) p (b) 2q (c) 3r (d) 6r

Q.9) The slope of velocity - time graph gives the :

- (a) displacement (b) acceleration (c) velocity (d) distance

Q.10) In the following which is a vector quantity :

- (a) Force (b) Energy (c) Mass (d) Work done

Section – D VERY SHORT QUESTIONS

Q.11) What do you mean by solid angle ?

Q.12) Write the principle of homogeneity of dimensions .

Q.13) Define acceleration and write its SI unit.

Q.14) Define displacement vector .

Section – E SHORT ANSWER QUESTIONS TYPE-1

Q.15) 5.76 g of a substance occupies 1.2 cm^3 . Express its density by keeping the significant figures in view.

Q.16) Two forces whose magnitude are in the ratio 3 : 5 give a resultant of 35 N. If the angle of inclination be 60° , then calculate the magnitude of each force .

Section – F SHORT ANSWER QUESTIONS TYPE-2

Q.17) Define instantaneous velocity. The position of an object moving along x-axis is given by $x = a + bt^2$,

Where $a = 8.5 \text{ m}$, $b = 2.5 \text{ m s}^{-2}$ and t is measured in seconds. What is its velocity at $t = 0 \text{ s}$ and $t = 2 \text{ s}$.

Q.18) Derive the following equations of motion for uniformly accelerated motion from velocity-time graph :

- (a) $s = ut + \frac{1}{2}at^2$ (b) $v^2 = u^2 + 2as$

Section – G LONG ANSWER QUESTIONS

Q.19) (a) Convert 1 dyne force into newton.

(b) Find the dimensions of $(a \times b)$ in the equation $E = (a - t^2) / bx$, where E is energy , x is distance and t is time .

(c) The centripetal force ' F ' acting on a particle moving in a uniform circular motion depends upon its mass (m) , velocity (v) and radius (r) of a circle . Obtain dimensionally an expression of centripetal force.

Q.20) Define projectile and projectile motion . Show that the trajectory of projectile motion is parabolic . Also find the time of flight , maximum height and range of the projectile during this motion .