

Code: A-P223113-M

I Semester Exam – 2024-25**3 x 980**

Std.: XI

Sub: **PHYSICS**Marks: **50**

Date:

Roll No.: _____

Time: **2½ hrs.****General Instructions :-**

- Section-A** : Q.No. 1 contains 7 multiple choice type of questions carrying one mark each.
Q.No. 2 contains 7 very short answer type of questions carrying one mark each.
- Section-B** : Q.No. 3 to Q.No. 13 are 11 short answer - I type of questions carrying 2 marks each. (Attempt any eight)
- Section-C** : Q.No. 4 to Q.No.19 are 6 short answer - II type of questions carrying 3 marks each. (Attempt any four)
- Section-D** : Q.No. 20 to Q.No. 23 are 4 long answer type of questions carrying four mark each. (Attempt any two)
- Use of Logarith Tables is allowed.
Use of calculator is not allowed.

Section - A**Q.1 Select and write the correct answer.****7**

- S.I. unit of energy is joule and it is equivalent to _____
(A) 10^6 erg (B) 10^{-7} erg (C) 10^7 erg (D) 10^5 erg
- Dimen.sions of kinetic energy are the same as that of _____
(A) Dimensions force (B) acceleration (C) work (D) pressure
- If $\hat{n}$ is the unit vector in the direction of $\vec{A}$ then, _____
(A) $\hat{n} = \vec{A} / |\vec{A}|$ (B) $\hat{n} = \vec{A} / |\vec{A}|$ (C) $\hat{n} = |\vec{A}| / \vec{A}$ (D) $\hat{n} = \hat{n} \times \vec{A}$
- The bob of a conical pendulum undergoes _____
(A) Rectilinear motion in horizontal plane (B) Uniform motion in a horizontal circle
(C) Uniform motion in a vertical circle (D) Rectilinear motion in vertical circle
- Torque applied is maximum when the angle between the directions of $\vec{r}$ and $\vec{F}$ is _____
(A) 90° (B) 180° (C) 0° (D) 45°
- The geometric length of a bar magnet having half magnetic length 5 cm is _____
cm
(A) 12 (B) 10 (C) 6 (D) 4.2
- The wire of length L and resistance R is stretched so that its radius of cross-section is halved. What is its new resistance?
(A) 5R (B) 8R (C) 4R (D) 16R

Q.2 Answer the following.**7**

- What are the dimensions of power?
- Define the term equal vectors.
- A man throws a ball to maximum horizontal distance of 80 m. Calculate the maximum height reached.
- Define the term inelastic collision.
- A bar magnet of magnetic moment 5.0 Am^2 has the poles 20 cm apart. Calculate the pole strength.
- Define the term magnetic equator.
- What is current density?

P.T.O

Section - B

Attempt any Eight

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- Q.3 If the formula for a physical quantity is $X = a^4 b^3 / c^{1/3} d^{1/2}$ and if the percentage error in the measurements of a, b, c and d are 2%, 3%, 3% and 4% respectively. Calculate percentage error in X.
- Q.4 Find unit vector parallel to the resultant of the vectors $A = \hat{i} + 4\hat{j} - 2\hat{k}$ and $B = 3\hat{i} - 5\hat{j} + \hat{k}$
- Q.5 If $\vec{V}_1 = 3\hat{i} + 4\hat{j} + \hat{k}$ and $\vec{V}_2 = \hat{i} - \hat{j} - \hat{k}$ determine the magnitude of $|\vec{V}_1 + \vec{V}_2|$
- Q.6 A car travels in a circle at the constant speed of 50 m/s and completes one revolution in 40 s. Determine the magnitude of acceleration of the car.
- Q.7 Obtain an expression for the horizontal range of a projectile.
- Q.8 A force $\vec{F} = 3\hat{i} + \hat{j} - 4\hat{k}$ is applied at a point (3, 4, -2). Find its torque about the point (-1, 2, 4).
- Q.9 Define temperature coefficient of resistance and state its unit.
- Q.10 Define coefficient of restitution. State its value in case of a elastic, perfectly elastic and perfectly inelastic collision.
- Q.11 State properties of magnetic lines of force.
- Q.12 Define magnetic flux. State its SI unit.
- Q.13 Explain series combination of resistors.

Section - C

Attempt any Four.

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- Q.14 Define dimensions and dimensional formula of physical quantities. Give two examples of dimensional formula.
- Q.15 State and prove parallelogram law of vector addition. Determine magnitude and direction of resultant vector.
- Q.16 A body is Projected with a velocity of 30 m/s at an angle of 30° with the vertical. Find the (i) maximum height (ii) time of flight (iii) the horizontal range.
- Q.17 Define (a) one ohm resistance (b) Drift velocity (c) Current density
- Q.18 In case of an elastic head on collision between two bodies, derive an expression for the final velocities of the bodies interms of their masses and velocities before collision.
- Q.19 A battery of emf 12 V and internal resistant 3Ω is connected to a resistor. If the current in the circuit is 0.5 A,
i. Calculate resistance of resistor.
ii. Calculate terminal voltage of the batterg when the circuit is closed.

Section - D

Attempt any Two

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- Q.20** Time period of a simple pendulum depends upon the length of pendulum (L) and acceleration due to gravity (g). Using dimensional analysis, obtain an expression for time period of a simple pendulum.
- Q.21** Show that the path of a projectile is a parabola.
- Q.22** Explain the terms inertial and non-inertial frame of reference.
Write a note on electromagnetic (EM) force.
- Q.23** Show that the magnitude of magnetic field at a point the axis of a short bar magnet is twice the magnitude of magnetic field at a point on the equator at the same distance. A short bar magnet has magnetic moment of 0.48 J/T . Give the direction and magnitude of the magnetic field produced by the magnet at a distance of 10 cm from the centre of the magnet on (i) the axis (ii) the equatorial lines (normal bisector) of the magnet.
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