Paper Code: _____ P-491

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ESKP-xi1901
PHYSICS – Inter Part I

Time: 3 hours **Marks: 85**

Note: There are THREE Sections in this paper i.e. A, B & C. Attempt Section-A and return it to the Superintendent within the given time. No marks will be awarded for cutting, erasing and overwriting. Mobile Phones are strictly prohibited in Examination Hall.

Time: 20 minutes **Section-A** **Marks: 18**

QNo.1 Select the correct option and shade (A,B,C,D) in the given Bubble Answer Sheet.

i. Equation $|\vec{A} . \vec{B}| = |\vec{A} \times \vec{B}|$ is correct for θ = _____.
A- 30° ● B- 45° C- 60° D- 90°

ii. Area under velocity-time graph is called _____.
A- Speed B- Acceleration C- Velocity ● D- Distance traveled

iii. Range of a projectile will be maximum for θ = _____.
A- 0° B- 90° C- 60° ● D- 45°

iv. The portion of a wave above the mean level is called _____.
A- Trough B- Wave length C- Amplitude ● D- Crest

v. The increase in the speed of sound for each degree rise above 0°C is _____.
A- 6.1 $m.s^{-1}$ ● B- 0.61 $m.s^{-1}$ C- 0.061 ms^{-1} D- 0.0061 ms^{-1}

vi. Signal from a remote control to the device operated by it travel with the speed of _____.
A- Supersonics B- Sound ● C- Light D- Ultrasonic

vii. The tip of needle does not give a sharp image. It is due to _____.
A- Polarization B- Interference ● C- Diffraction D- Refraction

viii. The S.I Unit of molar specific heat capacity is _____.
A- J.mole K B- J.mole k^{-1} C- $J.k^{-1}$ ● D- $J.mole^{-1}k^{-1}$

ix. The measure of disorder of a system is called _____.
A- Heat capacity ● B- Entropy C- Internal energy D- None of these

x. The estimated diameter of the earth is _____.
A- 12.7μm B- 12.7G.m C- 12.7 p.m. ● D- 12.7 M.m

xi. The number of significant figures in 10.80J are _____.
A- Two B- Three ● C- Four D- Five

xii. If R_x and R_y both are negative then θ lies in _____ quadrant.
A- 1^{st} B- 2^{nd} ● C- 3^{rd} D- 4^{th}

xiii. The device used to measure the rate of flow of liquid in pipe is called _____.
A- Spectrometer ● B- Venturimeter C- Interferometer D- Barometer

xiv. According to Stooke's law drag force depends on _____ velocity.
● A- Instantaneous B- Initial C- Final D- Terminal

xv. Tuning of a radio set is an example of _____ resonance.
A- Mechanical B- Musical ● C- Electrical D- None of these

xvi. One Joule per second is equal to _____.
A- 1 Pascal B- 1 Newton ● C- 1 Watt D- 1 Joule

xvii. The value of escape velocity is _____.
● A- $11.2x10^3 m.s^{-1}$ B- $11.2x10^3 km.s^{-1}$ C- $111.2km.s^{-1}$ D- $211.2km.s^{-1}$

xviii. Moment of inertia for thin walled cylinder is _____.
● A- MR^2 B- $\frac{1}{2}MR^2$ C- $2/5\ MR^2$ D- $1/12\ Ml^2$

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PHYSICS – Inter Part I

Note: Time allowed 2:40 hours

SECTION – B

Marks: 40

Q2: Answer any TEN parts. Each part carries equal marks.

i. Show that rate of change of angular momentum is equal to torque.

ii. Write any four uses of ultrasonics.

iii. A soap bubble looks black when it bursts, why?

iv What is the difference between isothermal and adiabatic expansion of Carnot Cycle.

v. Deduce the dimensions of the Gravitational Constant.

vi Explain how cranes are able to lift very heavy load without toppling?

vii. Define number "π" and show that 2π radians = 360°.

viii Differentiate solar energy and tidal energy.

ix. Define orbital velocity and prove that $V \propto \frac{1}{\sqrt{r}}$, where 'r' is the radius of orbit, and 'v' is speed of satellite.

x. State Torricelli's theorem. Show that $V = \sqrt{2gh}$

xi. Define projectile motion, and prove the range of a projectile is given by $R_{max} = \frac{Vi^2}{g}$

xii. Is there any connection between "F" and "x" of a spring mass system? Explain

xiii. Explain briefly vector product of two vectors.

SECTION – C

Marks: 27

Note: Attempt any THREE of the following. All questions carry equal marks.

Q3: a) Show that the speed of fluid through any pipe is inversely proportional to the cross sectional area of pipe i.e. $V \propto \frac{1}{A}$.

b) A mass at the end of a spring describes S.H.M with a period of 0.8sec. Find the acceleration when the displacement is 6cm.

Q4: a) Define molar heat capacities Cp and Cv for a gas. Show that for a mole of an ideal gas Cp – Cv = R.

b) A man weighing 800N runs up a flight of stairs in 5sec. The vertical height of stairs is 6.5m. Calculate the power of the man.

Q5: a) Explain Newton's formula for the speed of sound. Show that how it was corrected by French scientist Laplace?

b) An object of 2400g falls from a height of 1800cm on the sand below. If it penetrates 2cm into the sand, what opposing force is exerted on it by the sand?

Q6: a) Define elastic and inelastic collisions. Derive mathematical equation for calculating the final velocities of the elastically colliding bodies in one dimension.

b) A string 2000m long is used to whirl a 300gm stone in a horizontal circle at a speed of 3 $m.s^{-1}$. Find tension in the string.