Serial No. of Answer Book		Roll Number
_____	**Physics Part-I**	_____

Fic. No. _____

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Physics Part-I

SECTION "A"

Time: 20 Min   Marks: 18

Note: Use this Sheet for this Section. No marks will be awarded for cuttings erasing and over writing.

Q.1 Write the correct option i-e (A,B,C,D) and write it in the given relevant box.

(i). Which of the following is a derived quantity.
(a). Time   (b). Area   (c). Mass   (d). Length

(ii) Which of the following is not a unit of length?
(a). cm   (b). Light Year   (c). Radian   (d). Meter

(iii). $\vec{A}.\vec{B} = \vec{A} \times \vec{B}$ if angle between $\vec{A}$ and $\vec{B}$ is.
(a). 0^0 (b). 90^0 (c). 30^0 (d). 45^0

(iv). If a force of 10N is applied parallel to a moment arm of 5m the torque is.
(a). 50 N   (b). 5 N   (c). 10 N   (d). Zero

(v). A body is dropped from a 5m high tower. Its initial velocity is .
(a). 5 m/s   (b). Zero   (c). 10 m/s   (d). 50 m/s

(vi). Dimension of impulse is similar to dimension of ………….
(a). Force   (b). Work   (c). Torque   (d). Momentum

(vii). Work done by a centripetal force is…….
(a). Positive   (b). Zero   (c). Negative   (d). None

(viii). The correct expression for escape velocity on earth is.
(a). gRe   (b). $\sqrt{g\,Re}$ (c). $\sqrt{2g\,Re}$ (d). 2gRe

(ix). The frequency of Second's pendulum is.
(a). 0.5 Hz   (b). 2 Hz   (c). 0.2 Hz   (d). 5 Hz

(x). In transverse wave the distance between crest and trough is equal to……..
(a). λ (b). 2λ (c). $\frac{\lambda}{4}$ (d). $\frac{\lambda}{2}$

(xi). Expression for angular velocity of a body performing S.H.M is written as.
(a). $w = 2\pi/f$ (b). $w = f/2\pi$ (c). $w = 2\pi f$ (d). None

(xii). One nm is equal to.
(a). 10^{-3}m   (b). 10^{-10}m   (c). 10^{-6}m   (d). 10^{-9}m

(xiii). The ray and wave fronts are mutually………..
(a). Parallel   (b). Anti Parallel   (c). Perpendicular   (d). None

(xiv). Bragg's Law is given by.
(a). $2d \sin\theta = n\lambda$ (b). $d = n\lambda \sin\theta$ (c). $d = 2\lambda$ (d). None

(xv). 104^0 F is equal to.
(a). 82^0 C   (b). 40^0 C   (c). 32^0 C   (d). 323^0 C

(xvi). Mean translational K.E per molecule of an ideal gas at temperature T is.
(a). $\frac{2}{3}$ KT   (b).KT^4 (c). $\frac{1}{2}KT^2$ (d). $\frac{3}{2}$ KT

(xvii). The process in which volume of the system remain constant.
(a). Iso thermal   (b). Iso choric   (c). Iso baric   (d). None

(xviii). The rotational analogue of force is.
(a). Weight   (b). Impulse   (c). Torque   (d). None

Physics Part-I

Time: Allowed: 2.40h   Marks: 67

SECTION "B"

Q2.   Answer in Short any Ten (10) of the following Parts. Each Part has equal marks.   (40)

   (i)   Write the principle of the dimensional homogeneity of physical equations.

   (ii) $(\vec{A} \times \vec{B})^2 + (\vec{A} \cdot \vec{B})^2 = A^2 B^2$ Prove it.

   (iii)   The gravitational Force acting on a satellite is always directed towards the centre of the earth does this force exert torque on the satellite?

   (iv)   In long jump what factors determine the span of the jump?

   (v)   Distinguish between elastic and inelastic collision, giving one example of each.

   (vi)   Estimate your muscle power.

   (vii)   Why does an astronaut in an orbiting satellite feel weightless?

   (viii) Describe the working of an engine carburetor.

   (ix)   Define Free and Forced Oscillations giving one example of each.

   (x)   Differentiate between Transverse waves and Longitudinal waves.

   (xi)   Explain constructive and destructive interference of light.

   (xii)   What are different types of optical fibres?

   (xiii) Is it Possible to cool a room by keeping the refrigerator door open?

SECTION "C"

Note: Attempt any THREE questions. All questions carry equal marks.   (27)

Q3. (A) State and explain Scalar Product of two vectors.   (5)

   (B) Find the value of "q" for which the following two vectors will become perpendicular to each other.

   $\vec{A} = 2\hat{i} - 4\hat{j} + \hat{\kappa}$ $\vec{B} = 13\hat{i} - q\hat{j} + \hat{\kappa}$ (4)

Q4.   (A) Show that rate of change of angular momentum is equal to torque $\Delta L / \Delta T = \tau$.   (5)

   (B) A wheel is revolving at a steady rate of 120 rev/min. what is(a) its angular velocity (b) the linear velocity of point on the wheel 0.25m from the axle.   (4)

Q5.   (A) Define diffraction grating and derive an equation for finding the wave length of light.(5)

   (B) The 546.1 nm wave length is observed at an angle of 81^0 in the third order spectrum of a diffraction grating. Calculate the number of lines per mm of the grating.   (4)

Q6.   Write short note on any two of the following.

   (i)   Resonance. $4\frac{1}{2}$

   (ii)   Simple Microscope. $4\frac{1}{2}$

   (iii)   Reversible and irreversible processes. $4\frac{1}{2}$

   (iv)   Escape velocity. $4\frac{1}{2}$