1ST SEM. /COMMON./2024(W)NEW

TH2 APPLIED PHYSICS-I

Full Marks: 70 **Time- 3 Hrs**

Answer any four Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

a. Write the SI unit of following Physical quantities.
(a) Power, (b) Pressure

b. Error in measurement of radius of a sphere is 2%. Find the percentage of error in measurement of its volume.

c. State parallelogram law of vector addition.

d. For what value of m, the vector $\overrightarrow{A} = 2\hat{\imath} + 3\hat{\jmath} - 6\hat{k}$ is perpendicular to $\overrightarrow{B} = 3\hat{\imath} - m\hat{\jmath} + 6\hat{k}$

e. Define work done and write its SI unit.

f. Define Co-efficient of friction.

g. Define Torque? Write its SI unit.

h. Define adhesive Force.

i. State Hooke's law and write the expression for it.

j. Convert 25˚C to Fahrenheit.

2. Answer **Any Six** Questions 5 x 6

a. State the principle of homogeneity. Using dimensional formula, check the correctness of the equation $v^2 - u^2 = 2as$, where symbols have the usual meaning.

b. Time period of oscillation of a simple pendulum in an experiment is recorded as 2.56s, 2.62s, 2.70s, 2.58s, and 2.45s. Find mean time period and mean absolute error?

c. Derive the expression for recoil velocity of the gun by the application of conservation of linear momentum.

d. Explain the conservation of mechanical energy for a freely falling body.

e. State & Explain Law of conservation of angular momentum.

f. Write down the five applications of surface tension.

g Derive the expression for Co-efficient of Thermal Conductivity (K). Write its SI Unit & dimensional formula.

Answer **Any Two** Questions

3. (i) Using dimensional analysis to obtain an expression for centripetal force of a particle revolving in a horizontal circle that depends on mass (m) of the particle, radius of the circle (r) and velocity (v). [5+5]

	(ii)	The ratio between the magnitudes of two forces is 3:5 and the magnitude of their resultant is 35 N. If two forces are inclined at an angle 60^0, then find their individual magnitudes.	
4.	(i)	Define limiting friction and state laws of limiting friction.	[3+7]
	(ii)	Write methods to reduce friction.	
5.	(i)	Derive the relation between coefficient of linear expansion (α) and coefficient of superficial expansion (β).	[5+5]
	(ii)	Derive the relation between Coefficient of linear expansion (α) and cubical expansion (γ).	
6.	(i)	Derive an expression showing the relationship between torque and Moment of Inertia. Hence define Moment of Inertia (MI).	[5+5]
	(ii)	Write five applications of Bernoulli's Theorem.	