C. U. SHAH UNIVERSITY
Summer Examination-2022

Subject Name: Physics - I

Subject Code: 4SC01PHY1   **Branch: B.Sc. (All)**

Semester: 1   **Date: 26/04/2022**   **Time: 11:00 To 02:00**   **Marks: 70**

Instructions:
 (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 (2) Instructions written on main answer book are strictly to be obeyed.
 (3) Draw neat diagrams and figures (if necessary) at right places.
 (4) Assume suitable data if needed.

Q-1		**Attempt the following questions:**	**(14)**
	a)	What is the difference between vectors and scalars?	01
	b)	What is a frame of reference?	01
	c)	Define Amplitude in simple harmonic oscillations.	01
	d)	What is elasticity?	01
	e)	State Hooke's law.	01
	f)	Mention the value of acceleration due to gravity (g) along with its unit.	01
	g)	Give the statement of Newton's third law of motion.	01
	h)	Express the formula for moment of inertia.	01
	i)	What is Newton's law of gravitation?	01
	j)	Obtain acceleration due to gravity g of a place where a simple pendulum of length 100 cm performs 30 oscillations in a minute.	01
	k)	Name different types of vectors.	01
	l)	Give formula and units: Angular velocity ω and Angular acceleration α.	01
	m)	What is phase and phase constant (phase angle) in simple harmonic motion?	01
	n)	Define escape velocity.	01

Attempt any four questions from Q-2 to Q-8

Q-2		**Attempt all questions**	**(14)**
	a)	What is Homogeneous Differential Equation? Write formula for the first order Differential Equation.	**07**
	b)	Explain in detail: Gravitational potential and Gravitational potential energy.	**07**
Q-3		**Attempt all questions**	**(14)**
	a)	Describe scalar product of two vectors and their properties.	**07**
	b)	Derive the formula for the Vector Triple Product of three vectors.	**07**
Q-4		**Attempt all questions**	**(14)**
	a)	Explain: Transformer.	**07**
	b)	Derive the formula for the relation between γ, η and σ.	**07**

Q-5   **Attempt all questions**   **(14)**

a) Define self-induction. Derive the formula for self-inductance   **07**
$L = -\varepsilon \, \partial I / \partial t$. Also, prove that in the presence of magnetic field the
energy stored in an inductor is $W = 1/2 \, LI^2$.

b) Derive the expression for total energy of a simple harmonic motion.   **07**

Q-6   **Attempt all questions**   **(14)**

a) Explain briefly the various modulus of rigidity.   **07**

b) Derive an expression for rotational kinetic energy of a rigid body.   **07**

Q-7   **Attempt all questions**   **(14)**

a) Describe: Postulates of special theory of relativity.   **02**

b) Explain: Faraday's law of electromagnetic induction.   **05**

c) Write a note on vector integration and explain each terms.   **07**

Q-8   **Attempt all questions**   **(14)**

a) Write a short note on Work and Power.   **08**

b) Write Kepler's laws in detail.   **06**