Enrollment No:	Exam Seat No:	
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C.U.SHAH UNIVERSITY

Summer Examination-2019

Subject Name: Physics I Subject Code: 4SC01PHY1

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

Semester: 1 Date: 19/03/2019 Time: 02:30 To 05:30 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) Define scalars.
- **b)** What is a frame of reference?
- c) Mention any two uses of a multimeter.
- **d)** Give the statement of Newton's third law of motion.
- e) Express the formula for moment of inertia.
- **f**) Define escape velocity.
- g) State Thevenin's theorem.
- **h)** What is elasticity?
- i) What is Newton's law of gravitation?
- j) Does energy remain conserved in an elastic collision?
- **k**) State Hooke's law.
- 1) Give the full form of GPS.
- m) Mention the value of acceleration due to gravity (g) along with its unit.
- **n)** Define amplitude of a wave.

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

Q-2 Attempt all questions (14)a) Define conservative force. Prove that the work done by the conservative force (05)along a closed path is always zero. **b)** Find the angle between two vectors A and B; where $\vec{A} = 2 \hat{\imath} - \hat{\jmath} + \hat{k}$ and (03) $\overrightarrow{B} = 3 \,\hat{\imath} + 4 \hat{\jmath} - \hat{k}.$ c) Name and differentiate between the two types of vector products. (06)**Q-3 Attempt all questions** (14)a) Define: Centre of mass. Derive an expression for the centre of mass of the system of large number of particles. (05)**b)** State and derive the work energy theorem. (05)c) Briefly explain the physics behind GPS. (04)**Attempt all questions** (14)**Q-4** a) Explain briefly the various modulus of rigidity. (07)**b**) Derive the relation between angular momentum (L) and moment of inertia (I). (05)



	c)	Give example each of conservative and non-conservative forces.	(02)
Q-5		Attempt all questions	(14)
	a)	Derive an expression for the gravitational potential energy for a point outside the	(09)
		sphere with proper diagram.	
	b)	Derive an expression for rotational kinetic energy of a rigid body.	(05)
Q-6		Attempt all questions	(14)
	a)	State and prove Norton's theorem.	(09)
	b)	State Kepler's laws of motion. How can one understand planetary motion based	(05)
		on Kepler's laws.	
Q-7		Attempt all questions	(14)
	a)	Explain the concept of time dilation using suitable example.	(08)
	b)	Differentiate between musical sound and noise.	(04)
	c)	State Newton's law of cooling.	(02)
Q-8		Attempt all questions	(14)
	a)	Define self-induction. Derive the formula for self-inductance	(08)
		$L = -\varepsilon/(\partial I/\partial t)$. 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	(06)

