

C.U.SHAH UNIVERSITY

Summer Examination-2020

Subject Name : Physics-I

Subject Code : 4SC01PHY1

Branch: B.Sc. (All)

Semester: 1

Date: 02/03/2020

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 MCQs.	(14)
	a) Which one of the following is the fundamental universal forces? (a) Gravitational force (b) Conservative force (c) Frictional force (d) Contact force	01
	b) Gravitational constant G in Newton's Law of Gravitation is.... (a) $6.67 \times 10^{-10} Nm^2.kg^2$ (b) $6.67 \times 10^{-11} Nm^2.kg^{-2}$ (c) $5.67 \times 10^{-12} Nm^2.kg^{-2}$ (d) $5.67 \times 10^{-13} kg^2 Nm^{-2}$	01
	c) If the work done by the force is independent of path and dependent only on the initial and final positions, it is called.....force. (a) Gravitational (b) Frictional (c) Conservative (d) Contact	01
	d) Units of Pressure, Stress and Modulus of Elasticity, respectively, are... (a) Pa, Pa, Pa (b) $Nm^{-2}; Nm^{-2}; Nm^{-2}$ (c) $Nm^2; Nm^2; Nm^2$ (d) Options (a) & (b) both	01
	e) Vector is the quantity depends upon... (a) Magnitude and Direction both (b) Direction only (c) Either Magnitude or Direction (d) Only Magnitude	01
	f) What is the unit of Poisson's ratio? (a) Pa (b) Unitless (c) Nm^{-2} (d) Options (a) & (c) both	01
	g) The units of linear frequency and angular frequency, respectively, are ... (a) meter & rad/s (b) rad/s & Hz (c) Hz & rad/s (d) m/s & rad/s	01
	h) The accepted value and unit of Acceleration due to gravity (g) is (a) $9.81 m/s^2$ (b) $10 m/s^2$ (c) $3.12\pi m/s^2$ (d) Options (a) & (c) both	01
	i) Calculate acceleration due to gravity (g) of a place where a simple pendulum of length 100 cm performs 30 oscillations in a minute. (a) $986.96 cm/s^2$ (b) $10^3 cm/s^2$ (c) $981 cm/s^2$ (d) $312\pi cm/s^2$	01
	j) The escape velocity from the Earth's surface is... (a) 112 km/s (b) 11.2 km/s (c) 1.12 km/s (d) 0.112 km/s	01
	k) Who gave the laws of planetary motion? (a) Pascal (b) Newton (c) Kepler (d) Coulomb	01
	l) What are the main quantities measured by a Multimeter? (a) Current (b) Voltage (c) Resistance (d) All	01
	m) According to Hook's law, within elastic limits, the ratio of Stress to Strain is ... (a) Constant (b) 1 (c) 0 (d) ∞	01
	n) What is the full form of G.P.S.? (a) Global Pressure System (b) Global Positioning System	01



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

- Q-2 Attempt all questions (14)**
- (A) Describe Vector product of two vectors and its properties. **07**
- (B) Describe Scalar product of two vectors and its properties. **07**
- Q-3 Attempt all questions (14)**
- (A) Discuss : Newton's Laws of Motion. **07**
- (B) Discuss: Work energy theorem. **07**
- Q-4 Attempt all questions (14)**
- (A) Define: Elastic collision. Derive final formula for velocities of one-dimensional elastic collision formula. Discuss the two special cases when (1) Both particles have the same mass (2) One of the particle is at rest. **09**
- (B) Distinguish : Linear motion versus Rotational motion. **05**
- Q-5 Attempt all questions (14)**
- (A) Explain the terms (i) Angular Velocity, (ii) Angular acceleration, (iii) Torque (iv) Angular momentum **08**
- (B) Derive the relations: (1) $\vec{L} = I \vec{\omega}$ (2) $\vec{\tau} = I \vec{\alpha}$ **06**
- Q-6 Attempt all questions (14)**
- (A) Write a brief note on applications of *G.P.S.* **07**
- (B) Define: Escape Velocity. Derive its formula $V_{escape} = (2 \cdot g \cdot R_{earth})^{1/2}$. Calculate the escape velocity from the earth. **07**
- Q-7 Attempt all questions (14)**
- (A) Explain various types of stress and strain and derive necessary expressions for Young's, Bulk and Rigidity Moduli of elasticity. **09**
- (B) Obtain Young's modulus of a 300 cm long metal wire of diameter 0.5 mm showing elongation of 0.9 mm by 9 kg load. ($g = 3.122 \pi \text{ ms}^{-2}$) **05**
- Q-8 Attempt all questions (14)**
- (A) A hollow cylinder of mass 4 kg and diameter 20 cm is rotating about its geometrical axis when 50 N force is applied tangentially on it by a thin string wound around it. Calculate Torque, Angular acceleration, Angular velocity, Angular momentum, Rotational Kinetic energy and Moment of Inertia at the end of 9th second from the starting of the rotation. **09**
- (B) Calculate the power required by an Elevator of rest mass 200 kg lifting two persons of total mass 100 kg from the ground level to the 10th floor each of height 5 m in just 100 seconds? **05**

