Enrollment No: _____ Exam Seat No: _____

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) $6.67\times10^{-10}Nm^2.kg^2$ (b) $6.67\times10^{-11}Nm^2.kg^{-2}$
(c) $5.67\times10^{-12}Nm^2.kg^{-2}$ (d) $5.67\times10^{-13}kg^2Nm^{-2}$ **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 Magnitute 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) 3.12π 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) 312πcm/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**

(c) Global Precision System (d) Geo Position Satellite

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) $\vec{L} = I\,\vec{w}$ (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 $V_{escape} = (2.g.R_{earth})^{1/2}$. 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 Yong'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. ($g = 3.122\,\pi\,ms^{-2}$)	**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 9^{th} second from the starting of the rotation.	**09**
	(B)	Calculate the power requited by an Elevator of rest mass 200 kg lifting two persons of total mass 100 kg from the ground level to the 10^{th} floor each of height 5 m in just 100 seconds?	**05**