P P SAVANI UNIVERSITY

First Semester of Diploma Examination

January 2022

IDSH1020 Engineering Physics

25.01.2022, Tuesday **Time: 12:30 a.m. To 3:00 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in same answer sheet.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1	**Answer the Following**:	**[05]**
(i)	What is the number of significant figures in 0.06070?	
(ii)	Can there be motion in two dimensions with acceleration in only one dimension?	
(iii)	Define displacement. What are its characteristics?	
(iv)	Name a factor on which the inertia of a body depends.	
(v)	What is the work done by Earth's gravitational force in keeping the moon in its orbit in a complete revolution?	
Q - 2 (a)	Explain Absolute error, Relative error and Percentage error with an appropriate equation.	**[05]**
Q - 2 (b)	Define uniform circular motion and derive the equation for centripetal acceleration using proper diagram.	**[05]**
	OR	
Q - 2 (a)	Write a Shote note on Vernier caliper.	**[05]**
Q - 2 (b)	Explain (I) Triangle method and (II) parallelogram method for vector addition with an appropriate diagram.	**[05]**
Q - 3 (a)	1. Give the statement of (I) Newton's First Law of motion (II) Newton's second Law of motion (I)Newton's third Law of motion	**[03]**
	2. Define (I) Inertia (II) momentum	**[02]**
Q - 3 (b)	A proton and an electron are in motion with both having kinetic energy equal to 100 eV. Which of these two particles have more speed? ($m_e = 9.1 \times 10^{-31}$ kg and $m_p = 1.6 \times 10^{-27}$ kg)	**[05]**
	OR	
Q - 3 (a)	Solve: A ball of mass 150 g and velocity 12 m/s coming towards a batsman is hit by him with a force of 480 N in such a way that the ball moves with velocity 20 m/s in the opposite direction. Find the time of contact between the ball and the bat.	**[05]**
Q - 3 (b)	state and prove the work-energy theorem.	**[05]**
Q - 4	**Answer the Following (Attempt any one).**	**[05]**
(i)	Define Projectile. Derive the equations of the path of projectile and time require to achieve maximum height.	
(ii)	Define momentum and discuss the conservation law of momentum with an appropriate example.	

SECTION – II

Q - 1	**Answer the Following. (Any five)**	**[05]**
(i)	What is called elastic body?	
(ii)	State Hook's law.	
(iii)	What is called modulus of rigidity?	
(iv)	The heat flows through solids only by _____. (Fill in the blank)	
(v)	What is boiling point of water in kelvin?	
(vi)	Which of the following is not used for the measurement of temperature? (a)Thermistor, (b) Geyser, (c) Pyrometer, (d) Thermometer.	

(vii)	Give definition of Simple Harmonic Motion.	
Q - 2 (a)	Explain elastic limit of the body and explain Stress- Strain diagram in detail.	**[05]**
Q - 2 (b)	A weight of 5 kg is loaded to a wire of 2 meter length and 5 mm diameter. Young's modulus of the wire is 1.1×10^{12} dyne/cm Find the change length of the wire.	**[05]**
	OR	
Q - 2 (a)	State Law of Thermal Conductivity and define Coefficient of thermal conductivity and write its S.I. unit.	**[05]**
Q - 2 (b)	From the surface of 1 m^2 area of the Sun, 6.3×10^7 J of the thermal energy is emitted per every second. Find out the temperature of the surface if $\sigma = 5.669 \times 10^{-8}$ w/m^2k^4.	**[05]**
Q - 3 (a)	What is Simple Pendulum? Derive the equation for time period of Simple Pendulum.	**[05]**
Q - 3 (b)	Calculate the period of a simple pendulum whose length is 4.4 m in Japan where the local gravity is 9.81 m/s^2.	**[05]**
	OR	
Q - 3 (a)	Define and differentiate between the two: Longitudinal waves and Transverse waves.	**[05]**
Q - 3 (b)	How far does sound travels in air when a tuning fork of frequency 250 Hz completes 100 vibrations? The speed of sound in air is 340 m/s.	**[05]**
Q - 4	**Answer the Following. (Attempt any one).**	**[05]**
(i)	Define and differentiate between the two: Periodic motion and Oscillatory motion	
(ii)	What is Bernoulli's theorem and give its applications?	

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