

B.Sc. Semester - 1 (NEP-2020) Examination

OCT/NOV-2024

PHY: Mechanics and Solid-State Electronics (Multidisciplinary Course)

Time: 2:00 Hours

Marks: 50

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.1 Answer the following questions. (Any two). (10)

- (1) Write a note on damped oscillations.
- (2) Derive equation of motion for SHM.
- (3) Derive equation of time period $T=2\pi\sqrt{l/g}$ for simple pendulum.

Que.2 Answer the following questions. (Any two). (10)

- (1) Write a note on Young's Modulus by Searl's Method.
- (2) Explain Modulus of rigidity and Poisson's Ratio.
- (3) Explain Longitudinal, Shearing and Volume Strain.

Que.3 Answer the following questions. (Any two). (10)

- (1) Explain properties of PN Junction.
- (2) Write a note on P type Semiconductors.
- (3) Explain intrinsic and extrinsic semiconductors.

Que.4 Answer the following questions. (Any five). (10)

- (1) Describe Simple harmonic motion as projection of uniform circular motion.
- (2) Draw graph for Zener diode characteristics and also draw its symbol.
- (3) Explain knee voltage.
- (4) A wire of the length 1m and radius 1 mm is hanged by 500g mass, When hanged, 5mm stretching was observed. Calculate the young's modulus of the wire. Take $g = 10 \text{ m/s}$.
- (5) A particle of mass 1 kg is performing SHM under a force $F = - (10\text{N/m}) x$. If it crosses the mean position with a speed of 5m/s, find the amplitude of the Motion.
- (6) Define: (1) Time Period (2) Frequency
- (7) Draw the graph for Volt-Ampere characteristics of PN junction.
- (8) Define: (1) Stress (2) Strain
- (9) Explain Hooke's law.

Que.5 Answer the following questions. (Any two). (10)

- (1) Write a note on Torsion pendulum.
- (2) Write a note on angular SHM.
- (3) Write a note on formation of PN junction.
