

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

OCT/NOV-2024

PHY: Mechanics and Solid-State Electronics (Major-1)

Time: 2:00 Hours

Marks: 50

Instructions:

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

Que.1 Answer the following question (any two). (10)

- (1) Explain simple harmonic motion.
- (2) Explain simple harmonic motion as a projection of circular motion.
- (3) Write a short note on energy conservation in harmonic motion.

Que.2 Answer the following question (any two). (10)

- (1) Explain stress.
- (2) Write a short note on young's modulus by Searl's method.
- (3) Write a short note on use of torsion pendulum

Que.3 Answer the following question (any two). (10)

- (1) Write a short note on energy band of semiconductors.
- (2) Explain n-type semiconductor.
- (3) Explain pn junction.

Que.4 Answer the following question (any five). (10)

- (1) Explain following terms regarding simple harmonic motion.
(i) Frequency (ii) Phase
- (2) The resultant force acting on a particle performing simple harmonic motion is 2N when it is 4 cm away from the mean position. Find the spring constant.
- (3) A particle of mass 20 gm executes a simple harmonic motion of amplitude 3 cm. If the time period is 0.30 s, find the total mechanical energy of the system.
- (4) Explain longitudinal strain.
- (5) Explain shearing strain.
- (6) Explain Poisson's ratio.
- (7) Explain effect of temperature on extrinsic semiconductor.
- (8) Discuss reverse characteristic of pn junction diode.
- (9) Explain knee voltage with diagram.

Que.5 Answer the following question (any two). (10)

- (1) Write a short note on forced oscillation and resonance.
- (2) Explain Young modulus and bulk modulus .
- (3) Write a short note on Zener diode.
