

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

- (1) Explain simple harmonic motion.
- (2) Derive an equation of simple harmonic motion.
- (3) Write a short note on damped harmonic motion.

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

- (1) Explain stress.
- (2) Describe strain.
- (3) Write a short note on young's modulus by Searl's method.

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

- (1) Write a short note on semiconductors.
- (2) Explain p-type semiconductor.
- (3) Explain pn junction.

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

- (1) Explain following terms regarding simple harmonic motion.
(i) Amplitude (ii) Time period
- (2) The resultant force acting on a particle performing simple harmonic motion is 1N when it is 2 cm away from the mean position. Find the spring constant.
- (3) A particle of mass 100 gm execute a simple harmonic motion. The restoring force is provided by spring constant 20 N/m. Find the time period.
- (4) Explain Hook's law.
- (5) Describe Young's modulus.
- (6) Explain Poisson's ratio.
- (7) Explain in short about extrinsic semiconductor.
- (8) Discuss about forward bias of pn junction diode.
- (9) Explain knee voltage.

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

- (1) Write a short note on forced oscillation and resonance.
- (2) Explain torsion pendulum.
- (3) Discuss about effects of temperature on semiconductors.
