

B.Sc. Semester - 2 (NEP-2020) Examination

MARCH/APRIL-2026

PHY: Mechanics and Solid-State Electronics (Major-3)

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 gravitational potential and gravitational potential energy.
 - 2) Derive an equation for velocity of an artificial satellite of earth in an orbit.
 - 3) Explain the state of weightlessness.
- Que. 2 Answer the following question (any two). (10)
- 1) Describe circuit details and working of centre-tape full wave rectifier with necessary circuit diagram.
 - 2) Write a short note on capacitor and choke input filter.
 - 3) What is voltage stabilization? Explain zener diode as voltage stabilizer.
- Que. 3 Answer the following question (any two). (10)
- 1) Write a short note on transistor action.
 - 2) Explain common base connection in detail.
 - 3) Discuss the input and output characteristics of common emitter transistor circuit.
- Que. 4 Answer the following question (any five). (10)
- 1) A sphere of mass 40 kg is attracted by second sphere of mass 15 kg. Calculate gravitational force acting among these spheres. ($G=6.533 \times 10^{-11} \text{ Nm}^2$)
 - 2) Define gravitational field and intensity of gravitational field.
 - 3) Write statements of Kepler's second and third laws of planetary motion.
 - 4) Explain semiconductor diode in short.
 - 5) Compare half wave and full wave rectifier.
 - 6) Give the definition of rectifier efficiency and ripple factor.
 - 7) Discuss inherent variations of transistor parameters.
 - 8) In a common emitter configuration, if $\beta=100$ and $I_B=50\mu\text{A}$, calculate the value of collector current.
 - 9) Discuss stabilization in transistor.
- Que. 5 Answer the following question (any two). (10)
- 1) Write a short note on GPS.
 - 2) Write a note on half wave rectifier.
 - 3) Explain base register method of transistor biasing.
