647510 **BSCphMJ203x-2C** **Seat No :_____**

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

JUNE – 2024

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.

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

1) State and prove Kepler's first law of planetary motion.
2) Explain the state of weightlessness.
3) Write a short note on GPS.

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

1) Write a short note on semiconductor diode.
2) Describe circuit details and working of centre-tapped full wave rectifier with necessary circuit diagram.
3) Write a short note on zener diode.

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

1) Explain working of PNP transistor.
2) Explain common emitter connection in detail.
3) Discuss the voltage divider bias method.

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

1) Give the statement of Newton's law of gravitation and write the equation of it.
2) Give the definition of gravitational potential energy. Write the equation of it.
3) Calculate the escape velocity of the surface of moon, taking radius 1700 km and mass 7.3×10^{22} kg.
4) Give the definition of rectification. How many types of rectifier? Give name.
5) Give the definition of filter circuit. How many types of filter circuit? Give name.
6) Give the definition of rectifier efficiency and ripple factor.
7) Draw the symbols of PNP and NPN transistors.
8) Draw the circuit diagram of common base connection for PNP transistor.
9) In a common emitter configuration, if $\beta=50$ and $I_B = 25\mu A$, calculate the value of collector current.

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

1) Explain escape velocity of earth.
2) Write a note on half wave rectifier.
3) Discuss the input and output characteristics of a common base transistor circuit.

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