No. of Printed Pages : 4

Sem-I-Phy-GE-A_1(R&B)

2023

Time - 3 hours

Full Marks - 60

*Answer **all groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer all questions and fill in the blanks as required. [1 × 8

(a) Moment of Inertia depends upon _____ and _____.

(b) Write the dimensional formula of Surface Tension.

(c) Write the differential equation of SHM.

(d) Write two forms of wave equation.

(e) Define Entropy.

(f) Write the doping element used to produce P-type semiconductor.

(g) Draw the circuit diagram of forward biased P-N junction.

(h) Write the relation between $\vec{\phi}$, $\vec{B}$ and $\vec{A}$.

P.T.O.

GROUP - B

2. Answer any eight of the following within two or three sentences each. [1½ × 8

(a) Define radius of gyration.

(b) Establish the relation between Gravitational Potential and Field Intensity.

(c) Define co-efficient of viscosity.

(d) Explain Resonance.

(e) Write the formula for velocity of transverse wave in stretched string.

(f) Temperature of source is 127^0 C and sink is 27^0 C. Calculate the efficiency of Heat engine.

(g) Draw Half wave rectifier circuit diagram.

(h) Draw LCR circuit with A.C.

(i) State Gauss law of electrostatic.

(j) State Ampere's circuital law.

GROUP - C

3. Answer any eight of the following within 75 words each. [2 × 8

(a) State and prove parallel axis theorem of M.I.

(b) Write the equation relating Y, B, η.

(c) Explain damped harmonic motion with diagram.

(d) Write the relation between v, n, λ for waves.

(e) Write differences between reversible and irreversible process.

(f) State Carnot's theorem.

(g) Write any two Maxwell thermodynamic relation.

(h) State two postulates of Plank's law.

(i) Draw the circuit diagram of π filter.

(j) Derive relation between α and β in CE configuration.

GROUP - D

*Answer **any four** questions within 500 words each.*

4. Derive expression for M.I. of solid sphere about the axis passing through its centre. [6

5. Obtain expression for Gravitational potential and field due to a thin spherical shell. [6

6. Derive equation for velocity of Longitudinal wave in elastic medium. [6

7. Derive expression due to superposition of two orthogonal simple harmonic vibrations with some frequency. [6

8. Explain Clausius Clapeyron equation. [6

9. Define thermal conductivity. Derive differential equation of heat flow in one dimension. [6

10. State Biot-Savart law. Derive expression for Magnetic Induction due to long straight conductor. [6