K25U 1329

Reg. No. : .....

Name : .....

Second Semester B.Sc. Degree (CBCSS – OBE – Supplementary/ Improvement) Examination, April 2025
(2019 to 2023 Admissions)
COMPLEMENTARY ELECTIVE COURSE IN PHYSICS
2C02PHY : Electricity, Magnetism and Thermodynamics

Time : 3 Hours Max. Marks : 32

PART – A

Short answer questions. Answer **all** questions. **Each** question carries **1** mark.

1. What is an indicator diagram ? Give its significance.
2. Write down the expression for magnetic induction at a point on the axis of a circular coil. Give its unit.
3. Define figure of merit of a ballistic galvanometer.
4. Define entropy. Give its unit.
5. What is antiferromagnetism ? **(5×1=5)**

PART – B

Short essay questions. Answer **any 4** questions. **Each** question carries **2** marks.

6. How is Carey Foster Bridge used to determine the temperature coefficient of resistance ?
7. State Biot Savart Law.
8. Briefly explain ferrimagnetism.
9. State second law of thermodynamics.
10. What is a moving coil ballistic galvanometer ? What are its uses ?
11. Define coefficient of performance of a refrigerator. Give its expression. **(4×2=8)**

P.T.O.

PART – C

Problems. Answer **any 3** questions. **Each** question carries **3** marks.

12. A moving coil galvanometer has the following characteristics: Number of turns of coil N = 50, Area of coil = 70 mm^2, Resistance of coil = 30 Ω, Flux density of radial field = 0.1 T, Torsional constant of suspension wire = 7×10^{-8} Nm/rad. Calculate the current sensitivity and voltage sensitivity.
13. One mole of a gas at 92°C expands isothermally until its volume is doubled. Calculate the work done.
14. The magnetization within a bar of some metal alloy is 1.2×10^6 A/m when the field is 200 A/m. Calculate (a) magnetic susceptibility (b) magnetic permeability and (c) magnetic induction of the alloy.
15. A Carnot engine whose source is at 127°C takes in 4200 J of heat in each cycle and gives out 2940 J of heat to the condenser. Find the temperature of the condenser.
16. The efficiency of a Carnot engine working between two temperatures is 0.2. When the temperature of the source is increased by 25°C the efficiency increases to 0.25. Find the temperatures of the source and sink. **(3×3=9)**

PART – D

Long essay questions. Answer **any 2** questions. **Each** question carries **5** marks.

17. Explain the conversion of galvanometer into an ammeter and voltmeter.
18. Derive the expression for work done in a Carnot cycle.
19. Obtain an expression for magnetic induction at a point due to a straight current carrying conductor.
20. Explain magnetic elements of the earth's magnetic field. **(2×5=10)**