K23U 2002

Reg. No. : .....

Name : .....

II Semester B.Sc. Degree (CBCSS – OBE – Regular/Supplementary/ Improvement) Examination, April 2023

(2019 Admission Onwards)

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 magnetic induction ?
2. State and explain Biot-Savart's Law.
3. What is Ferrimagnetism ? Give two examples.
4. State zeroth law of thermodynamics.
5. Define the coefficient of performance of a refrigerator. **(5×1=5)**

PART – B

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

6. Derive the expression for the force on a current-carrying conductor in a magnetic field.
7. Prove that the entropy of a system increases in an irreversible process.
8. Obtain the relation between adiabatic and isothermal elasticity.
9. Obtain an expression for torque on a current loop in a uniform magnetic field.
10. How an unknown resistance is determined using Carey-Foster's bridge ?
11. Write a short note on diamagnetism and paramagnetism. **(4×2=8)**

P.T.O.

PART – C

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

12. Calculate the change in the entropy when 5 kg of water at 100 degree celsius is converted to steam at the same temperature (Latent heat of steam = 540 cal/g).

13. Two long parallel wires separated by 3 cm in air, carries a current of 100A. Find the force on the 1 m length of the wire.

14. The efficiency of an ideal engine is 0.2. If the temperature of the sink is lowered by 20°C, the efficiency becomes 0.25. Find the temperature of the source and sink.

15. One mole of helium at 27°C is compressed adiabatically so that pressure becomes 32 times its initial value. Find the final temperature and work done.

16. An iron rod 0.2 cm long, 10 mm in diameter and of relative permeability of 1000 is placed inside a long solenoid wound with 300 turns/m. If a current of 0.5 A is passed through the rod. Find the magnetic moment **(3×3=9)**

PART – D

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

17. Describe Carnot's cycle and obtain an expression for the efficiency of an ideal heat engine.

18. Discuss the theory and working principle of moving coil ballistic Galvanometer.

19. Discuss magnetic susceptibility and magnetic permeability. Obtain the relation between magnetic vectors – B, H & M.

20. With a suitable figure, explain the working principle of the potentiometer. Discuss how it is used for the calibration of low and high range voltmeter.

(2×5=10)