K20U 0478

Reg. No. : .....

Name : .....

II Semester B.Sc. Degree CBCSS (OBE)-Regular Examination, April 2020
(2019 Admission)
COMPLEMENTARY ELECTIVE COURSE IN PHYSICS
2C02 PHY : Electricity, Magnetism and Thermodynamics

Time : 3 Hours Total Marks : 32

PART – A

(Answer **all** questions. **Each** carries **1** mark)

1. Write any two properties of ferromagnetic materials.
2. What is magnetic flux ? Write its unit.
3. Write the uses of Carey Foester's bridge.
4. What are the significances of first law of thermodynamics ?
5. How will you explain dip ? **(5×1=5)**

PART – B

(Answer **any 4** questions. **Each** carries **2** marks)

6. State Biot Savart law. Also write its mathematical form.
7. Differentiate between diamagnetic materials and paramagnetic materials.
8. What are the conditions for a galvanometer to be dead beat and to be a ballistic ?
9. Prove that for a complete reversible cycle of change in the state of substance $\oint dS = 0$.
10. Internal energy is state function and not a path function. Explain.
11. How first law of thermodynamics leads to the concept of internal energy ? **(4×2=8)**

P.T.O.

PART – C

(Answer **any three** questions. **Each** carries **3** marks)

12. A Carnot engine whose lower temperature heat sink is at 30°C has its efficiency 35%. What is the temperature of the heat source ? By how much should the temperature of the source be raised if the efficiency is to be raised 65%.

13. A rod of magnetic material, 0.5 m in length has a coil of 300 turns wound over it uniformly. If a current 1.5 ampere is sent through it, calculate (a) the intensity of magnetization (b) the magnetic induction (c) the relative permeability of the material (given H = 900 A/m, $\chi_m 6 \times 10^{-3}$).

14. What is the magnetic field intensity at a distance of 5 cm due to a long straight conductor carrying a current of 1.5 A ?

15. In the Bohr model of the hydrogen atom, the electron circulates around the nucleus in a path of radius 5.29×10^{-11}m at a frequency of 6.58×10^{15} Hz. Find the magnitude of the magnetic induction at the centre of the orbit. What is its dipole moment ?

16. A soft iron ring has a mean diameter of 0.2 m and an area of cross section of 5×10^{-4} m^2. It is uniformly wound with a coil of 2000 turns and a current of 2A is passed through it. The magnetic flux produced in the iron ring is 8×10^3 Wb. Calculate the relative permeability of the iron. **(3×3=9)**

PART – D

(Answer **any two** questions. **Each** carries **5** marks)

17. Derive an expression for the magnetic induction at a point due to a straight conductor carrying current.

18. Explain the working principle of potentiometer. How will you calibrate ammeter and voltmeter ?

19. Describe about Carnot's cycle. Find the work done during an isothermal process.

20. Derive an expression for the adiabatic equation of a perfect gas. **(2×5=10)**

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