

Reg. No. : .....

Name : .....

**II Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/Improvement) Examination, April 2022  
(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 do you mean by the term magnetic susceptibility ?
2. Give an expression for the Lorentz force on a moving charge.
3. Is the force between two parallel current-carrying conductors attractive or repulsive ? What will be the situation, if the current is antiparallel ?
4. Give Mayer's relation. What are the terms involved in the relation ?
5. What is Carnot's theorem ? (5×1=5)

## PART – B

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

6. Write a short note on the magnetic elements at a place.
7. Give the schematic of a Carey Foster bridge and explain the parts involved.
8. Explain the Biot-Savart law.
9. List the conditions for a galvanometer to be ballistic. What do you mean by the figure of merit of a B.G. ?
10. Using a suitable block diagram, discuss the working principle of a refrigerator.
11. Give an expression for the change of entropy for a finite reversible change of a system. Prove that, in a cycle of reversible processes, the entropy of the system remains constant. (4×2=8)

P.T.O.

## PART – C

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

12. An iron rod 0.2 m long, 10 mm diameter and relative permeability 1000 is placed inside a long solenoid with 300 turns/metre. If a current of 0.5 ampere is passed through the rod, find the magnetic moment of the rod.
13. A square coil of side  $d$  carries a current  $i$ . Calculate the magnetic induction at the centre of the coil.
14. In a thermodynamic process, pressure of a fixed mass of a gas is changed in such a manner that the gas release 25 J of heat and 5 J of work is done on the gas. If the initial internal energy of the gas was 40 J, what will be the final internal energy ?
15. A quantity of dry air at 300 K is compressed suddenly to one third of its volume. Determine the change in temperature. Given,  $\gamma = 1.4$ .
16. A Carnot engine whose low temperature reservoir is at 7 degree Celsius has an efficiency of 50%. If it is desired to increase the efficiency to 70%, by how many degrees should the temperature of the high temperature reservoir be increased ? (3×3=9)

## PART – D

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

17. Discuss briefly the properties of diamagnetic, paramagnetic and ferromagnetic materials.
18. Using a suitable figure, explain the working principle of a potentiometer. Discuss how it can be used for calibrating an ammeter.
19. Discuss the working principle, construction and theory of a Ballistic Galvanometer.
20. What are isothermal and adiabatic processes ? Obtain expressions for the work done during isothermal and adiabatic processes using suitable indicator diagrams. (2×5=10)