TM254920X

Reg. No :.....

Name :.....

MASTER'S DEGREE (C.S.S) EXAMINATION, MARCH 2025

2020, 2021, 2022 ADMISSIONS SUPPLEMENTARY

PHYSICS SEMESTER IV - ELECTIVE COURSE

PH4E02TM20 - Science of Advanced Materials

Time : 3 Hours **Maximum Weight : 30**

Part A

I. Answer any Eight questions. Each question carries 1 weight **(8x1=8)**

1. Give the two advantages and disadvantages of nickel-cadmium battery.
2. Explain the properties of graphene.
3. Write a short note on the efficiency of fuel cells.
4. Categorize different color centers.
5. Comment on the three level lasing system.
6. Discuss the advantages of solar cells over photodiodes.
7. Distinguish between nematic and cholesteric crystals.
8. Derive an expression for coherence length of superconductors.
9. Mention any four applications of superconductivity.
10. Mention the conditions for growing crystals.

Part B

II. Answer any Six questions. Each question carries 2 weight **(6x2=12)**

11. Differentiate the action of solid-state and molten solvent batteries.
12. Discuss the principle and working of PEM Fuel Cell.
13. Explain photoluminescence.
14. Derive an expression for the absorption coefficient when a radiation is passing through an absorbing medium.
15. Explain the construction of ELED.
16. Describe the working of Faraday rotator.
17. Discuss the elements of BCS theory.
18. Describe any two methods of growth of crystals from the melt.

Part C

III. Answer any Two questions. Each question carries 5 weight **(2x5=10)**

19. Discuss the different fabrication techniques for CNT and CNF.
20. Discuss the threshold condition for laser.
21. With a neat diagram, explain the working of Pockels Cell.
22. What is a thin film? Elaborate the thermal evaporation method of film deposition.