TM244349R

Reg. No :.....

Name :.....

MASTER'S DEGREE (C.S.S) EXAMINATION, MARCH 2024

2022 ADMISSIONS REGULAR

SEMESTER IV - Physics

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. Explain an electrochemical cell. Give two examples.
2. Explain the properties of graphene.
3. Describe fuel cell stack.
4. Distinguish between temporal and spatial coherence.
5. Write a note on semiconductor lasers.
6. Discuss the advantages of solar cells over photodiodes.
7. Explain the features of amorphous semiconductors.
8. Substantiate the statement "Entropy difference between normal and superconducting states is related to latent heat of the system".
9. Briefly discuss the isotope effect of superconductors.
10. List the advantages of hydrothermal crystal growth.

## Part B

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

11. Explain the role of carbon nanomaterials as electrodes in batteries.
12. Explain how CNTS and CNFs are useful in fuel cells and hydrogen storage.
13. With the necessary explanation, describe the absorption and emission process.
14. Explain different laser modes.
15. Explain the construction of ELED.
16. Describe the working of Faraday rotator.
17. Discuss the vortex state of type II superconductors.
18. Discuss the floating zone method of crystal growth.

## Part C

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

19. Briefly elaborate on the different types of solid oxide fuel cells and give their advantages.
20. With the necessary theory, explain the working of photoconductive cell.
21. Explain the working of solar cell and discuss its characteristics.
22. Detail any two kinds of film deposition techniques.