20P409 (Pages: 2) Name: ……..…...

Reg. No……..

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2022

(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC19P PHY3 E17 - ADVANCED CONDENSED MATTER PHYSICS

(Physics - Elective Course)

(2019 Admission onwards)

Time: Three Hours Maximum: 30 Weightage

Section A

Answer ***all*** questions. Each question carries 1 weightage.

1. What are super lattices? Briefly explain.
2. Write a short note on Plasmons.
3. What are optoelectronic applications of thin films?
4. Differentiate between ternary and quaternary groups? Give suitable examples.
5. What is Fatigue?
6. How ironic conductivity of a solid depends on temperature? Plot the characteristic curve for a certain high pure material as an example.
7. Briefly explain semiconducting thin films and their importance.
8. Discuss screw and edge dislocations in solids.

(8 × 1 = 8 Weightage)

Section B

Answer any ***two*** questions. Each question carries 5 weightage.

9. Describe the Hartree- Fock approximation for the interacting electron gas by considering the Coulomb interaction. Comment the limitations also.
10. What are quantum dots? Discuss energy levels of quantum dots. Explain synthesis and applications of nano tubes.
11. Describe the imperfections in solids.
12. Explain (a) nucleation and growth and (b) solution deposition techniques for thin films.

(2 × 5 = 10 Weightage)

Section C

Answer any ***four*** questions. Each question carries 3 weightage.

13. Explain the radiation damages that occur in solids.
14. Explain Bloch and Wannier representations.
15. Explain photographic process.

16. What are magnons? Explain.
17. Explain phase diagram in alloys.
18. What is creep? Explain temperature dependence of creep.
19. Briefly discuss microelectronic applications of thin films.

(4 × 3 = 12 Weightage)

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