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Reg. No.....

Name.....

M.Sc. DEGREE (C.S.S.) EXAMINATION, JUNE 2018

Second Semester

Faculty of Science

Branch II : Physics–A—Pure Physics

PH2C08—CONDENSED MATTER PHYSICS

(2012 Admission onwards)

Time : Three Hours Maximum Weight : 30

Part A (Short Answer Type Questions)

Answer any **six** *questions.*
Each question carries weight 1.

1. State the properties of reciprocal lattice.
2. What is meant by density of states ? Explain.
3. List the merits of Drude-Lorentz model.
4. What are Brillouin zones ?
5. Explain diffusion length.
6. What is Hall Effect in semiconductors ?
7. Briefly explain the properties of phonons.
8. Explain piezoelectricity in solids.
9. State and explain Hund's rule.
10. What is meant by fullerene ?

(6 × 1 = 6)

Part B

Answer any **four** *questions.*
Each question carries weight 2.

11. Derive the Bragg's equation for crystal lattices.
12. Discuss the movement of electrons in a three dimensional well.

Turn over

13. Obtain the minority carrier lifetime and the mobility of current carriers in semiconductors.

14. Determine the classification of ferroelectric materials.

15. Give an account on macroscopic quantum interference.

16. Discuss on quantum dots and rings

(4 × 2 = 8)

Part C

Answer **all** *questions.*
Each question carries weight 4.

17. (a) Discuss FD statistics and the effect of temperature on FD distribution .

Or

(b) Bring out the various elements of crystal structure with examples.

18. (a) Obtain Bloch theorem and establish Kronig-Penny model.

Or

(b) Describe Hall Effect set up for determination of Hall coefficient with theory.

19. (a) Discuss the Debye model for specific heat of solids.

Or

(b) Give an analysis of dielectric properties of solids.

20. (a) Describe quantum theory of ferromagnetism and its applications.

Or

(b) Discuss the BCS theory for superconductors.

(4 × 4 = 16)