

(4)

Or

- (b) Describe the law method in the characterisation of nano materials and explain Bragg's law in diffraction.

Total Pages—4

M.Sc.—Phy-IVS(CC-404)

2019

Time : 3 hours

Full Marks : 80

Answer from **both** the Sections as per direction

The figures in the right-hand margin indicate marks

Candidates are required to answer in their own words as far as practicable

(CONDENSED MATTER AND MATERIAL PHYSICS - II)

SECTION – A

1. Answer any *four* of the following : 4 × 4
- (a) Explain the absorption spectra of materials.
 - (b) Obtain the relation between Einstein *A* and *B* coefficients.
 - (c) Write a note on curie point and the exchange interaction.
 - (d) Write a note on spintronics.

(2)

- (e) Explain the elementary ideas about polymers.
(f) Write a note on thermal conductivity.

Or

2. Answer *all* questions : 2×8

- (a) Define colour centers.
(b) Define induced absorption.
(c) Define Curie temperature.
(d) What is Neel temperature ? Explain.
(e) Define Knight shift in NMR.
(f) What are spin waves ? Explain.
(g) State Bragg's law.
(h) Define thermal conductivity.

SECTION – B

Answer **all** questions : 16×4

3. (a) Define Luminescence, Fluorescence and phosphorescence. Explain the elementary ideas of optical fibers.

(3)

Or

- (b) Define spontaneous and stimulated emission and describe the principle and working of He-Ne laser.

4. (a) Explain Van Vleck paramagnetism and with a note on Pauli paramagnetic susceptibility.

Or

- (b) Obtain Curie-Weiss law and explain the susceptibility below the Neel temperature.

5. (a) Explain the Landau's theory of diamagnetic susceptibility and write a note on specific heat.

Or

- (b) Discuss the Mott's theory of spin-dependent scattering of electrons and write a note on CMR.

6. (a) Explain about nano science and nano cluster. Explain the effect of size and surface volume ratio on properties of nano materials.