Or

(*b*) Explain the basic principle of Raman effect and Describe the Mössbauer technique.

M.Sc.–Phy-IVS (CC-404)

2018

Time : 3 hours

Full Marks : 80

Answer from **both** the section 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 absorption spectra of materials.

   (*b*) Obtain relation between Einstein *A* and *B* coefficients.

   (*c*) Write a note on Van Vleck paramagnetism.

   (*d*) Explain spintronics.

(*e*) Give the elementary ideas of polymers.

(*f*) Write a note on heat capacity.

Or

2. Answer *all* questions from the following : 2 × 8

(*a*) Define absorption

(*b*) What are colour centers ?

(*c*) What is exchange interaction ?

(*d*) Define Curie temperature.

(*e*) What is Knight shift ?

(*f*) What is Graphene ?

(*g*) State Bragg's law.

(*h*) Define geometrical structure factor.

SECTION – B

Answer **all** questions : 16 × 4

3. (*a*) Explain Luminiscence, Fluorescence and phosphorescences. Discuss the elementary ideas of optical fibres.

Or

(*b*) Define induced absorption and explain the principle and working of He-Ne laser.

4. (*a*) Explain pauli paramagnetic susceptibility and discuss the deviations of Curie law.

Or

(*b*) State and explain Curie Wiess law and discuss the susceptibility below the Neel temperature.

5. (*a*) Explain in detail the Landau's theory of diamagnetic susceptibility.

Or

(*b*) Explain the theory of NMR and discuss the GMR materials.

6. (*a*) Explain the liquid drop model in nano materials and discuss the tight binding approximation.