S.Y. M.SC.(Physics) Fourth Semester Old

MSC24101 - Solid State Physics-II Paper – I

P. Pages : 2 **GUG/W/18/2417**

Time : Three Hours * 1 8 8 9 * Max. Marks : 80

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1. Either:

a) Explain the vacancies and point detects. **8**
Discuss the difference between Schottky and Frenkel defects.

b) What do you mean by colour centres? How are they produced. **8**

OR

e) Discuss the mechanism of luminescence. What is the concentration quenching. **8**

f) Explain radiative and non radiative transition in luminescence. **8**

2. Either:

a) What are ferro electric substance? Discuss theory of ferro electricity. **8**

b) Discuss the dielectric response of an electron gas. **8**

OR

e) Explain paramagnetic and ferromagnetic substance? **8**
What is Bohr magnetron?

f) Discuss the Neel's theory to explain antiferromagnetism. **8**
Discuss the temperature dependence of the susceptibility of an antiferromagnetic material.
How does the theory account for this variation.

3. Either:

a) Discuss principle of nuclear magnetic resonance. **8**
Draw block diagram of a typical experiment NMR study.

b) Discuss applications of NMR in the study of solids. **8**

OR

e) What is role of ESR spectroscopy for study of irradiated materials? **8**

f) Discuss any one of the application of Mossbauer spectroscopy. **8**

4. Either:

a) Describe outline of BCS theory of super conductivity? Discuss the BCS ground state energy. **8**

b) Find an expression of London equations in super conductivity and define penetration depth. **8**

OR

e) What is Meissner effect? Explain it. **8**

f) What are the microwave and infrared properties of superconductor. **8**

5. Attempt all the following.

a) How the average distance of dislocation motion is related to macroscopic strain. **4**

b) Discuss dielectric loss in solid. **4**

c) Discuss applications of magnetic resonance in solids. **4**

d) Explain the thermodynamic properties of superconducting state. **4**

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