



**Material Science  
(1030)**

**P. Pages : 2**

**Time : Three Hours**

**Max. Marks :100**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. From each question attempt **any two** sub question out of a, b, c.
5. Use of Non - programmable calculator is allowed.

**UNIT - I**

1. a) What is plastic deformation ? Explain mechanism of plastic deformation with neat sketches. **10**
- b) i) Explain edge dislocation and screw dislocation in detail. **6**  
ii) Find the no. of atoms/cm<sup>2</sup> on (100) plane of lead (FCC) if the inter atomic distance is 3.499Å. **4**
- c) i) Classify composites. Explain fiber reinforced composites in brief. **6**  
ii) Show that the atomic packing factor for FCC crystal is 0.74. **4**

**UNIT - II**

2. a) What is fatigue ? Define fatigue limit. Explain method of testing metals for fatigue. **10**
- b) Define hardness List various methods to determine hardness of material. Explain vickers hardness test in detail. **10**
- c) i) List various NDT tests and explain magnaflux testing. **6**  
ii) Explain Dye penetrant test. **4**

**UNIT - III**

3. a) i) Explain the method of plotting equilibrium diagram by use of cooling curve. **6**
- ii) Explain Hume Rothery rule for solid solubility **4**
- b) Draw a typical eutectic system diagram and explain it with suitable example. **10**
- c) Write short note on. **10**
- i) Solid solution Hardening.
- ii) Dispersion Hardening.

**UNIT - IV**

4. a) Explain the stages for manufacture of powder metallurgy component in detail. **10**
- b) i) Describe the advantages and applications of powder metallurgy. **6**
- ii) Define the following terms. **4**
- i) Apparent density                      ii) Tap density
- iii) Green strength                      iv) Green spring
- c) Write short note on. **10**
- i) Resistance Pyrometer.
- ii) Total Radiation Pyrometer.

**UNIT - V**

5. a) i) What is oxide film ? Explain its formation and growth mechanism. **6**
- ii) Differentiate between anodic coatings and cathodic coatings. **4**
- b) List the method of corrosion control and prevention. Explain inhibitor in detail. **10**
- c) Explain in brief. **10**
- i) Hydrogen evolution mechanism of corrosion.
- ii) Physical Vapour Deposition.

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