Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

M.Sc.(Physics) (2015 to 2017) (Sem.–3)

MATERIALS TESTING AND CHARACTERIZATION TECHNIQUES

Subject Code : MPH-303

M.Code : 72616

Time : 3 Hrs. Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. **Attempt any FIVE questions, including compulsory Question No.9**

1. a) Discuss the role of statistical errors in measurements. (8)

   b) Describe briefly the basic characterization techniques required for the Characterization of materials. (12)

2. With a general diagram of Scanning Tunneling microscope, explain the function of various components. Discuss how it can be used for characterizing the materials. (20)

3. Discuss the various methods for measuring grain size, particle morphology, particle size and size distribution and their importance. (20)

4. What is the importance of crystal structure determination in materials? Discuss the various methods in detail for the structure determination using X-ray diffraction. (20)

5. a) Discuss the significance of 'tensile hardness' & 'torsion testing' in materials characterization. (10)

   b) Cite the five factors that may lead to scatter in fatigue life data. (10)

6. a) Explain differential scanning calorimetry for the characterization of material. With a labeled sketch of DSC, explain its working. (12)

   b) What do you mean by thermogravimetric analysis and how it is helpful in describing various properties of materials? (8)

7. a) With a general diagram describe the basic principles and components of an optical microscope. (12)

   b) Discuss the importance of 'colour metallography' in materials characterization. (8)

8. Discuss in detail

a) Photo luminescence (10)

b) Scanning electron microscopy (10)

9. Write briefly : (2.5×8=20)

(a) Which type of x-rays are used to study the crystal structure of materials?

(b) What is the magnifying power of an electron microscope?

(c) Explain the term 'Stereo-microscopy'.

(d) Define the term 'Creep' and its significance.

(e) Explain the term 'Thermo-Mechanical Analysis'.

(f) What is the significance of micro structure determination?

(g) Which techniques are used to study the defects in materials?

(h) Explain 'Torsion testing'.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.