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Total Number of Pages: 2

M.TECH

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MMPC201

2nd Semester Back Examination – 2016-17

CHARACTERIZATION OF MATERIALS

BRANCH(S): MME

Time: 3 Hours

Max Marks: 70

Q.CODE:Z478

Answer Question No.1 which is compulsory and any five from the rest.

The figures in the right hand margin indicate marks.

- Q1 Answer the following questions: (2 x 10)
- a) What is TGA?
 - b) What is characteristics radiation?
 - c) What is filter?
 - d) What is atomic scattering factor?
 - e) What do mean by texture?
 - f) What is X-ray photoelectron spectroscopy?
 - g) What is astigmatism?
 - h) What is backscattered electron?
 - i) What is Lorentz polarization factor?
 - j) What is FTIR spectroscopy?

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- Q2 a) Write down the basic principles of generation of X-ray with schematic. (5)

- b) Differentiate between DSC and DTA. (5)
- Q3 a) Describe the Debye Scherer's powder diffraction method. (5)
- b) Determine structure factor for the FCC crystal. (5)
- Q4 Calculate the crystal structure and lattice parameter of the diffraction pattern of unknown crystal. The following data are given to you for a powder Diffractometer using CuK_α radiation $\lambda = 1.54056 \text{ \AA}$ and diffraction angle (2θ): 43.3, 50.5, 74.2, 90.0, 95.2, 117.0, 136.6, and 144.8. (10)
- Q5 a) Write down the advantages and disadvantages of TEM over SEM. (5)
- b) Explain briefly the types of image obtained in TEM. (5)
- Q6 a) Explain briefly basic principles of SEM with schematic. (5)
- b) Briefly describe the interaction of electron beam with sample. (5)
- Q7 a) Write down the basic principles of Energy Dispersive spectroscopy and its limitation. (5)
- b) Briefly describe the principles of atomic emission spectroscopy and its application. (5)
- Q8 Write short notes on any **two**: (5 x 2)
- a) Thermo Mechanical Analysis.
- b) Laue diffraction.
- c) Raman spectroscopy.
- d) Secondary electrons.