

Reg. No. :

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 49215

M.E. DEGREE EXAMINATION, DECEMBER 2014.

First Semester

CAD / CAM

14PCD524 - MATERIAL TESTING AND CHARACTERIZATION

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (5 x 1 = 5 Marks)

1. If ASTM grain size number is 1, approximate grain diameter (in mm)
(a) 0.1 (b) 0.2 (c) 0.25 (d) 10
2. X-ray diffraction fails to detect the presence of substances:
(a) Comprising less than 5 percent of a mixture.
(b) Containing a high concentration of carbon.
(c) Containing a magnetic field.
(d) Comprising elements with two or more isotopes
3. Which type of microscope has a useful magnification limit of about 1,000X?
(a) Light microscope
(b) Transmission electron microscope
(c) Scanning electron microscope
(d) Scanning probe microscope
4. Figure-out the odd point in the following
(a) Proportional limit (b) Elastic limit (c) Yield point (d) Fracture point
5. Time dependent recoverable deformation under load is called _____ deformation.
(a) Elastic (b) Anelastic (c) Elastic after-effect (d) Visco-elastic

PART - B (5 x 3 = 15 Marks)

6. What is the need for microstructure evaluation?
7. List different lattice systems and sketch the same.
8. What are “backscattered electrons” with respect to SEM.?
9. Differentiate between engineering stress and true stress with a stress strain diagram
10. Sketch the different stages in a creep curve and indicate the happenings in material transformation at each stage.

PART - C (5 x 16 = 80 Marks)

11. (a) What is the need for specimen preparation? Explain the various specimen preparation techniques. (16)

Or

- (b) With neat sketches, elaborate about the microstructures of different types of cast irons. (16)

12. (a) Write about Bragg’s law and explain the principle of X-Ray diffraction technique. Also list the applications of the X-Ray diffraction technique. (16)

Or

- (b) Explain the use of Debye Scherer camera used in diffraction measurement. (16)

13. (a) What are the limitations of optical microscopy? Explain about the basics of microscopy employing electron beams. (16)

Or

- (b) List the applications of AFM in material characterization. Explain its construction and working. (16)

14. (a) Explain any two different tests methods that can be employed for testing the hardness of soft materials. (16)

Or

- (b) Describe methods that can be used to determine the toughness of plastic materials. (16)

15. (a) What is need for determining the fatigue life of material? Explain about low and high cycle fatigue. (16)

Or

(b) What is creep? Explain Larson Miller parameter with reference to predicting creep behavior of material. (16)
