Reg. No. : | | | | | | | | | | |

Question Paper Code: 52212

M.E.DEGREE EXAMINATION, JUNE 2016

Second Semester

CAD / CAM

15PCD202 - APPLIED MATERIALS ENGINEERING

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 3 = 15 Marks)

1. What are strengthening mechanisms? Give their types.
2. What is Paris equation? State its use.
3. What do you meant by thermal analysis? State their types.
4. Explain the relationship between materials selection and processing.
5. Enumerate the uses of nano materials.

PART - B (5 x 14 = 70 Marks)

6. (a) Explain about the following:
   (i) Solid solutioning
   (ii) Grain refinement in steel (14)

Or

(b) Summarize the following:
   (i) Recovery (ii) Recrystallization (iii) Grain Growth (14)

7. (a) State the Griffith's theory of brittle fracture and drive an expression for fracture stress. (14)

Or

(b) Explain in detail about

(i) Fracture of non-metallic materials

(ii) Low cycle fatigue test (14)

8. (a) Compare the signals used for imaging in case of scanning electron microscope with respect to their energy, resolution, escape depth and application. (14)

Or

(b) Illustrate the methods of construction of phase diagram with use of XRD. (14)

9. (a) How the selection of materials is done by based on mechanical properties? Explain in detail. (14)

Or

(b) Suggest suitable material for the following applications and justify your selection,

(i) Cylinder block for passenger car (ii) Landing gear of aircraft

(iii) Fuselage of an aircraft (iv) Compressor blade of jet engine. (14)

10. (a) Select suitable material for the following applications and justify your selection Hull of ship, drinking water pipe line, food industry vessels and consumer durable casings. (14)

Or

(b) Compare the properties of following advanced structural ceramics such as WC, TiC, TaC, Al_2O_3, SiC, CBN, Diamond. (14)

PART - C (1 x 15 = 15 Marks)

11. (a) Brief the following:

(i) The techniques of sample preparation for electron microscopy

(ii) The specialties of stainless steel and high speed steel. (15)

Or

(b) (i) What is basic difference between SEM and TEM? And explain the working of TEM. (5)

(ii) What are the issues to be considered while selecting materials for low, medium, high temperature applications? Give few examples for each. (10)

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