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

Question Paper Code : 61119

M.E. DEGREE EXAMINATION, MAY/JUNE 2014.

First Semester

CAD/CAM

CI 9211/CI 911 — APPLIED MATERIALS ENGINEERING

(Common to M.E. Computer Integrated Manufacturing)

(Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write Hall Petch relation and mention its use.

2. What is yield point phenomenon?

3. What is fatigue strength?

4. What is the principle of fracture mechanics?

5. Name any two materials having stiffness higher than steel.

6. What do you understand by weighted property index?

7. Define weldability.

8. Why are secondary processes done on engineering materials?

9. List the applications of dual phase steels.

10. What are the important properties of engineering plastics?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the solid solution strengthening mechanism in detail. (16)

Or

(b) Discuss the fine particle strengthening mechanism in detail. (16)

12. (a) How does fracture take place in thick sheets and what values of toughness/fracture toughness may be expected in such a situation? What are the standard procedures for determining K_{IC}? (16)

Or

(b) A mild steel plate is subjected to constant amplitude uniaxial fatigue loads to produce stresses varying from σ_{max} = 180 MPa to σ_{min} = –40 MPa. The static properties of the steel are σ_0 = 500 MPa, S_u = 600 MPa, E = 207 GPa, and K_c = 100 MPa/m^2. If the plate contains an initial through thickness edge crack of 0.5 mm, how many fatigue cycles will be required to break the plate? (16)

13. (a) Discuss the properties that must be reviewed when making material selection. What are the differences among the property of stiffness, strength and toughness. (16)

Or

(b) Discuss the important properties to be considered for materials in automotive and marine applications. (16)

14. (a) Classify and explain with neat diagrams the different metal working operations based on the type of forces applied. (16)

Or

(b) Discuss on the process induced defects of metal forming operation. (16)

15. (a) Write a brief note on :

(i) Structural ceramics (8)

(ii) Maraging steel. (8)

Or

(b) Explain the technology involved in the fabrication of thin film of a solar cell. (16)
