Reg. No. :

Question Paper Code: 49215

M.E. DEGREE EXAMINATION, MAY 2015.

Elective

CAD / CAM

14PCD523 – MECHANICAL BEHAVIOR OF MATERIALS

(Regulation 2014)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions.

PART A - (5 x 1 = 5 Marks)

1. In plane stress condition, how many stress components are present?

     (a) 1   (b) 2   (c) 3   (d) 4

2. Strain hardening is takes place in

     (a) Quasi-static loading   (b) Static loading

     (c) Impact loading   (d) None of the above

3. The Young's modulus of a composite material based on

     (a) Fibre strength   (b) Matrix strength

     (c) Volume fraction   (d) None of the above

4. The dual phase steel consists of

     (a) Martensite   (b) Ferrite

     (c) Martensite and Ferrite   (d) None of the above

5. The suitable material for the environment with excessive heat is

     (a) Polymer composite   (b) Metal matrix composite

     (c) Ceramic matrix composite   (d) None of the above

PART - B (5 x 3 = 15 Marks)

6. How deviatoric stress differs from hydrostatic stress?

7. What is Von-mises stress?

8. Write the Halpin-tsai equations.

9. What is the advantage of dual phase steel (DPS)?

10. Define intermolecular force.

PART - C (5 x 16 = 80 Marks)

11. (a) Explain in detail about hydrostatic component of stress and deviatoric component of stress. (16)

Or

(b) Explain in detail about invariance of deviatoric stress tensor. (16)

12. (a) Explain Prandtle Reuss and Levy-Mises constitutive equation of plastic flow. (16)

Or

(b) Draw and explain the changes in engineering stress- strain curves for mild steel with change in working temperature. (16)

13. (a) Explain the mechanism of load transfer from matrix to fiber. (16)

Or

(b) Write short notes on

(i) Hygrothermal stress (8)

(ii) Transverse stress in composites (8)

14. (a) Write short notes on

(i) High strength low alloy steel (8)

(ii) Tranformation Induced Plasticity (TRIP) steel (8)

Or

(b) Explain the structure, properties and applications of any two shape memory alloys. (16)

15. (a) Discuss on the properties, processing and application of following materials

(i) Tungsten carbide (5)

(ii) Aluminum oxide (5)

(iii) Cubic boron nitrate (6)

Or

(b) Discuss on production techniques of fibers and foams. (16)

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