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[3762]-84

S.E. (Chemical) (First Semester) EXAMINATION, 2010

CHEMICAL ENGINEERING MATERIALS

(2003 COURSE)

Time : Three Hours

Maximum Marks : 100

N.B. :— (i) Answer 3 questions from section I and 3 questions from Section II.

(ii) Answers to the *two* sections should be written in separate answer-books.

(iii) Neat diagrams must be drawn wherever necessary.

(iv) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

Section I

1. (a) Explain the following terms :

(i) Stress-strain curve

(ii) Classification of Engineering Materials. [6]

(b) Define the following terms :

(i) Shear Strain

(ii) Shear Stress

(iii) Poisson's ratio

(iv) Factor of safety

(v) Necking. [10]

P.T.O.

Or

2. (a) Derive the relationship between engineering stress and true stress and engineering strain and true strains. [4]
- (b) Distinguish between toughness and resilience. [4]
- (c) Derive an expression for the impact stress induced due to falling load. [4]
- (d) Derive an expression of condition for necking. [4]

3. (a) Differentiate between slip and twinning. [4]
- (b) Describe the various imperfections in crystals and their effects on properties. [4]
- (c) Define fatigue strength and fatigue limit. [4]
- (d) Explain any *one* type of Hardness Test in brief. [4]

Or

4. (a) Write the difference between destructive and non-destructive hardness tests. [6]
- (b) Explain various types of Impact test. [10]
5. Draw Iron-Iron carbide Equilibrium diagram. Explain various reactions involved and different phases observed. [18]

Or

6. (a) Explain the following terms :
- (i) Insulation
  - (ii) Refractories
  - (iii) Types of steel. [12]
- (b) Discuss various methods of Welding. [6]

**Section II**

7. (a) Define corrosion. Explain any *two* types of corrosion. [8]
- (b) What is an oxide film ? Explain its formation and growth mechanism. [8]

Or

8. (a) Give and explain any *four* types of corrosion. [12]
- (b) Give the methods for prevention of corrosion. [4]
9. (a) Define the following terms :
- (i) Vulcanization of rubber
  - (ii) Nylon-6. [8]
- (b) Explain applications of teflon in brief. [4]
- (c) Draw stress-strain diagrams for rubber and polymers. [4]

Or

10. Explain the following terms (any four) :

- (i) Stress relaxation
- (ii) Tensile test of polymers
- (iii) Applications of polymers.
- (iv) Corrosion resistance of polymers.
- (v) Wear/Abrasion test.
- (vi) Thermoplastic polymers.

[16]

11. (a) What are the different types of glass? Explain the characteristics of one in detail. [6]

(b) Define ceramic materials and its applications. [6]

(c) Explain the process of vitrification. [6]

Or

12. Write short notes on (any three) :

- (i) Clays
- (ii) Cement
- (iii) Borosilicates
- (iv) Mechanical properties of Ceramics.

[18]