Total No. of Questions—12] [Total No. of Printed Pages—4

[3762]-173

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

CHEMICAL ENGINEERING MATERIALS

(2008 PATTERN)

Time : Three Hours **Maximum Marks : 100**

N.B. :— (*i*) Answer *three* questions from Section I and *three* 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*) Write the classification of Engineering Materials. [4]

(*b*) A wrought iron bar 50 mm in diameter and 2.5 m long transmits a shock energy of 100 N-m. Find the maximum instantaneous stress and elongation. Take E = 200 GN/m^2. [6]

(*c*) Derive an expression for the impact stress induced due to falling loud. [6]

P.T.O.

Or

2. (*a*) Explain the stress-strain curve for mild steel material. [6]

(*b*) Define the following terms :

(*i*) Toughness

(*ii*) Resilience

(*iii*) Breaking stress

(*iv*) Proportional stress

(*v*) Proof stress. [10]

3. (*a*) What are the different hardness tests ? Explain any *two* in brief. Draw neat sketch. [12]

(*b*) Explain the following terms :

(*i*) Charpy impact test

(*ii*) Izod impact test. [4]

Or

4. (*a*) Write a short note on Rockwell Hardness Test. [6]

(*b*) Explain various types of Impact Test with neat sketches. [10]

5. Draw $Fe\text{-}Fe_3C$ equilibrium diagram. Explain various reactions involved and different phases observed. [18]

Or

6. (*a*) Write short notes on :

(*i*) Bending

(*ii*) Rolling

(*iii*) Welding

(*iv*) Revetting. [12]

(*b*) Explain different types of steel in detail. [6]

SECTION II

7. (*a*) Give and explain any *four* types of corrosion. [12]

(*b*) Explain electro-chemical series of metals. [4]

Or

8. (*a*) Explain the different methods of prevention of corrosion. [12]

(*b*) What is an oxide film ? Explain its formation and growth mechanism. [4]

9. (*a*) Define the following terms :

(*i*) Vulcanization of rubber.

(*ii*) Nylon-6. [8]

(*b*) Write the applications of polymers. [4]

(*c*) Explain the 'Tensile test of polymers'. [4]

Or

10. (*a*) Explain polymerization and describe addition and condensation polymerization. [8]

(*b*) Write short notes on : [8]

(*i*) Natural polymers

(*ii*) Teflon in engineering.

11. (*a*) Explain the process of vitrification. [6]

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

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

Or

12. Explain the following terms :

(*i*) Glass and its types

(*ii*) Refractories and its applications

(*iii*) Mechanical properties of ceramics. [18]