

- (c) At the same temperature α -iron has bcc structure and γ -iron has fcc structure with a higher packing factor. Still γ -iron can hold more carbon than α -iron. Why ?

5,5,5

Unit III

5. (a) Classify the various cast irons. Discuss briefly their properties and applications in industry.
- (b) Discuss the various types of stainless steels, giving their composition. Which steel has superior corrosion resistance and why ?
- 8,7
6. (a) Write a short note on alloy tool steels giving suitable examples.
- (b) Explain briefly the applications, mechanical properties and workability of brass in comparison to bronze.
- 8,7

M-D-44

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D-44

B. Tech. EXAMINATION, May 2017

(Fourth Semester)

(B. Scheme) (Main & Re-appear)

(CHE)

CHE-206-B

MATERIAL TECHNOLOGY

Time : 3 Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Missing data can be assumed, if any. All questions carry equal marks.

(3-29/12)M-D-44

P.T.O.

Unit I

1. (a) What is the mechanism of corrosion ? Briefly discuss different types of corrosion encountered in engineering practice. What is the significance of electrochemical series ?
(b) A stainless steel sheet is welded into a circular duct. After a period of time, rust appears along a band extending about 0.5 inch on each side of the weld. Why did this occur and what measures can be taken to avoid it ? **8,7**
2. (a) Explain the factors affecting the selection of materials for constructional purposes in chemical industries ?
(b) Explain the role of non-metallic materials of construction in chemical industry with suitable examples. **8,7**

Unit II

3. (a) Give examples of point defects in a crystal lattice and explain atom diffusion within the crystal.

- (b) Differentiate between twin boundary and tilt boundary.
- (c) Define the term heat treatment and explain tempering and annealing heat treatment for eutectoid carbon steel.

5,5,5

4. (a) Draw the iron-carbon equilibrium phase diagram and show all the phases present therein. Explain eutectic and eutectoid reactions.
(b) At 1450°C, Thorium (Th) changes from one type of cubic unit cell to a different cubic cell, with a 0.5% decrease in volume during heating. Below 1450°C, the lattice parameter is 5.187 Å, while the lattice parameter of the higher temperature form is 4.11 Å. What is the ratio between the number of atoms in the unit cell of high-temperature form to the number of atoms in the unit cell of low-temperature form of Th ?

Unit IV

7. (a) What are Refractories ? Explain their properties and applications in industries with examples.
- (b) Distinguish between addition and condensation polymerisation. Give examples of polymers obtained by the above polymerisation mechanism and their application in industry. **8,7**
8. (a) Differentiate between crystalline and non-crystalline ceramic materials and give their applications in industries with examples.
- (b) Write a short note on speciality glasses, their properties and their applications in industry. **8,7**

Unit IV

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