

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III(New) • EXAMINATION – WINTER 2016

Subject Code:2130507

Date:09/01/2017

Subject Name: Material Science and Technology

Time:10:30 AM to 01:30 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

MARKS

- | | | |
|------------|--|-----------|
| Q.1 | Short Questions | 14 |
| 1 | Atomic packing factor of a face centered cube is equal to _____. | |
| 2 | The covalent compound are generally _____ Electrically. | |
| 3 | Give difference between Toughness and Resilience. | |
| 4 | _____ Failure starts at the point of highest stress. | |
| 5 | Griffth's theory applies only to completely _____ Materials. | |
| 6 | _____ grains makes the metal less tough. | |
| 7 | Both vacancies and schottky defects facilitate _____ diffusion. | |
| 8 | Metal that deforms by _____ shows a large bauschinger strain. | |
| 9 | _____ is a definite carbide of iron which is extremely hard. | |
| 10 | The main objective of annealing is to _____ the metals. | |
| 11 | The magnitude of critical cooling rate depends on the stability of the _____ | |
| 12 | _____ materials are defined as those containing phases that are compounds of metallic and Non-metallic elements. | |
| 13 | What are the constituents of glass? | |
| 14 | _____ Cement is most widely used known silicate. | |
| Q.2 | (a) Explain allotropy of Iron and Draw the space lattices that observed in α -Fe. | 03 |
| | (b) Name various defects observed in solids and discuss any one in detail | 04 |
| | (c) What is dislocation? Discuss briefly types of dislocation. | 07 |
| OR | | |
| | (c) Draw and explain iron-carbon equilibrium diagram with neat sketch. | 07 |
| Q.3 | (a) Discuss different types of unit cells with neat sketch. | 03 |

- (b) Write note on Covalent structure & Ionic structure with example. **04**
- (c) Explain Bragg's law for determination of crystal structures. **07**

OR

- Q.3** (a) Draw and explain cooling curve of an alloy of two metals which are completely soluble in liquid and solid phase. **03**
- (b) What is Gibb's phase Rule? Define system phase and degree of freedom so that the degree of freedom eutectic point in a binary phase diagram is zero. **04**
- (c) Discuss polymorphism and enantiotropy with suitable example. **07**
- Q.4** (a) What are the purposes of alloying? Give effects of any one alloying element. **03**
- (b) Compare annealing and normalizing process. **04**
- (c) Draw & explain TTT (Time Temp. & Transformation) diagram for eutectoid steel. **07**

OR

- Q.4** (a) Enlist the properties of pure copper and give name of two copper alloys. **03**
- (b) Enlist the properties of pure aluminum and mention the composition, properties and application of any one aluminum alloy. **04**
- (c) Explain types of stainless steel briefly. **07**
- Q.5** (a) Explain briefly high grade Refractories. **03**
- (b) Discuss types of glasses with their application **04**
- (c) Discuss in brief 'Nano catalysts'. **07**

OR

- Q.5** (a) Discuss setting and hardening of Portland cement. **03**
- (b) What are ceramic materials? State advantages of ceramic materials. **04**
- (c) Write short note on recent development in Nano materials. **07**
