

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2018****Subject Code:2162107****Date:27/11/2018****Subject Name:Heat Treatment****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

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

MARKS

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|------------|-----|---|-----------|
| Q.1 | (a) | What is Heat treatment? Enlist heat treatment processes. | 03 |
| | (b) | Briefly explain spheroidized annealing. | 04 |
| | (c) | How formation of austenite on heating is done for eutectoid steel ? Explain it. | 07 |
| Q.2 | (a) | Differentiate between Hardness and Hardenability. | 03 |
| | (b) | Differentiate between upper and lower Bainite. | 04 |
| | (c) | Explain Hull – Mehl model for pearlitic transformation. | 07 |
| OR | | | |
| | (c) | Discuss Bain distortion model. | 07 |
| Q.3 | (a) | List out all Annealing process. Explain full Annealing. | 03 |
| | (b) | Short note on thermo mechanical treatment | 04 |
| | (c) | Explain time temperature transformation (TTT) diagram. | 07 |
| OR | | | |
| Q.3 | (a) | Write note on Retained Austenite. | 03 |
| | (b) | Write Austenitic grain size measurement techniques? Explain any one method | 04 |
| | (c) | What is hardenability? Explain hardenability measurement by Jominy End Quench test. | 07 |
| Q.4 | (a) | “Hardening is followed by tempering treatment “Justify . | 03 |
| | (b) | Define Annealing, normalizing, hardening and tempering. | 04 |
| | (c) | Explain Austempering . | 07 |
| OR | | | |
| Q.4 | (a) | Discuss different Characteristics of Quenchants. | 03 |
| | (b) | Discuss induction hardening as method of surface hardening. | 04 |
| | (c) | What are different methods of case carburizing and give its need? Explain pack carburizing by coal. | 07 |
| Q.5 | (a) | Explain heat treatment of any plain carbon steel. | |
| | (b) | Discuss heat treatment of any low alloy steel. | 04 |
| | (c) | Explain HSS tool steel heat treatment. | 07 |
| OR | | | |
| Q.5 | (a) | Describe the nitriding techniques. | 03 |
| | (b) | List out defects in heat treated parts. Explain any one with causes and remedies. | 04 |
| | (c) | Discuss heat treatment of Cu alloys. | 07 |