

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI(NEW) – EXAMINATION – SUMMER 2019****Subject Code:2162107****Date:16/05/2019****Subject Name:Heat Treatment****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

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

- Q.1** (a) With neat sketch draw TTT diagram for hypereutectoid steel. **03**
(b) Define Heat treatment. List out heat treatment processes. **04**
(c) What is hardenability? Explain hardenability measurement by Jominy End Quench test. **07**
- Q.2** (a) What is Critical Cooling Rate? **03**
(b) How the continuous cooling diagram (CCT) does is differ from the isothermal transformation diagram. **04**
(c) Discuss Bain distortion model. **07**
- OR**
- (c) Explain mechanism of pearlitic transformation with neat sketch. **07**
- Q.3** (a) Why hardening is followed by tempering treatment? **03**
(b) Write a short note on thermo mechanical treatment. **04**
(c) Differentiate Annealing and Normalizing heat treatment processes. **07**
- OR**
- Q.3** (a) Discuss different Characteristics of Quenchants. **03**
(b) Describe the plasma nitriding techniques. **04**
(c) Write a note on tempering. **07**
- Q.4** (a) Write a note on secondary hardening. **03**
(b) Write a note on patenting. **04**
(c) Write a note on malleablizing annealing **07**
- OR**
- Q.4** (a) Write a note on temper embrittlement. **03**
(b) Explain the sub-zero treatment with its need. **04**
(c) List out Austenitic grain size measurement techniques? Explain any one method. **07**
- Q.5** (a) Discuss heat treatment of Austempering. **03**
(b) Explain induction hardening. **04**
(c) List defects in heat treated parts and discuss with causes and remedies. **07**
- OR**
- Q.5** (a) What is the purpose of Spheroidized Annealing? **03**
(b) Discuss age-hardening heat treatment for Al-Cu alloys. **04**
(c) What are different methods of case carburizing and give its need? Explain pack carburizing by coal. **07**
