

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII EXAMINATION – SUMMER 2016****Subject Code:172101****Date:16/05/2016****Subject Name:Physical Metallurgy - II****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.

- Q.1** (a) Explain austenite formation mechanism for eutectoid steel. **07**  
(b) Define hardenability and discuss jominy end quench test to measure hardenability. **07**
- Q.2** (a) Explain austenite grain size measurement technique and give its importance. **07**  
(b) What is bainite? Compare bainite in terms of properties with pearlite and martensite. **07**
- OR**
- (b) Discuss annealing process with reference to its three stages/steps. **07**
- Q.3** (a) Explain martensitic transformation in detail. **07**  
(b) What is quenching, give its example? Discuss requirements of good quenching media. **07**
- OR**
- Q.3** (a) What are different surface hardening processes? Explain depth of penetration and give its advantages. **07**  
(b) Write brief note on process of martempering and austempering. **07**
- Q.4** (a) List defects in heat treated part and discuss their causes and remedies. **07**  
(b) What is aging process? Give suitable example with its advantages. **07**
- OR**
- Q.4** (a) Draw neat sketch of Time Temperature Transformation Diagram and define nose temperature and critical cooling rate. **07**  
(b) Discuss nitriding process for surface heat treatment. **07**
- Q.5** (a) Write note on austempering process. **07**  
(b) Discuss Hull-Mehl model of pearlitic transformation. **07**
- OR**
- Q.5** (a) Explain the effect of alloying element on pearlitic transformation. **07**  
(b) With suitable example explain Continuous cooling transformation diagram. **07**

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