

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– III(OLD) EXAMINATION – SUMMER 2019****Subject Code: 133403****Date:07/06/2019****Subject Name: Engineering Materials And Metallurgy****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) Sketch and explain the Iron – Iron Carbide equilibrium diagram. **07**  
(b) Explain Nitriding process and state its advantages and disadvantages. **07**
- Q.2** (a) Explain in brief about the TTT curve with neat sketch. **07**  
(b) Discuss in brief about effect of Mo, Mn and Si alloy addition on Steel. **07**
- OR**
- (b) Define Constitution of alloy. Explain the isomorphism microstructural development with a neat sketch. **07**
- Q.3** (a) Classify phase diagram. Draw and explain about cooling curve for pure metal. **07**  
(b) How do you measure the hardenability of Steel by using Jominy end quench method with sketch? **07**
- OR**
- Q.3** (a) Write the procedure for measuring Hardness by using Rockwell Test with a sketch. **07**  
(b) Explain in brief about Composite materials and its properties. **07**
- Q.4** (a) What are case hardening and martempering treatments? What are their purposes? **07**  
(b) Write short notes about Bio degradable materials and its advantages. **07**
- OR**
- Q.4** (a) Differentiate clearly between thermoplastics and thermosetting plastics with suitable applications and examples. **07**  
(b) Write short notes about properties of ceramics materials. **07**
- Q.5** (a) Explain in brief about Super conductors and its properties. **07**  
(b) How to determine Creep limit by using Creep Testing Method with procedure. **07**
- OR**
- Q.5** (a) Write short notes on composition, properties and applications of austenitic stainless steel and high speed steel. **07**  
(b) Write the stages of heat treatment process. Write short notes on Annealing. **07**

\*\*\*\*\*