

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– III (New) EXAMINATION – WINTER 2019****Subject Code: 2133403****Date: 30/11/2019****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) Define: **03**  
1) Solid Solution  
2) Substitutional Solution  
(b) Explain Development of microstructures in Iron- carbon alloys **04**  
(c) Explain Iron-Iron carbide equilibrium diagram in details **07**
- Q.2** (a) Describe Jominy end quench test. **03**  
(b) Write a short note on CCT cooling curves. **04**  
(c) Explain Principle, methods and advantages of induction hardening with neat sketch. **07**
- OR**
- (c) Explain Principle, methods and advantages of Flame hardening with neat sketch. **07**
- Q.3** (a) Write down the classification of steels **03**  
(b) Write a short note on Copper alloys with application **04**  
(c) Explain Various Titanium Alloys and their applications. **07**
- OR**
- Q.3** (a) Write down applications of nickel and its alloys **03**  
(b) Write a short note on Aluminum and its alloys with application **04**  
(c) Explain Cobalt alloys with properties and applications. **07**
- Q.4** (a) Differentiate Metal and Non-Metallic Materials **03**  
(b) Differentiate Commodity Plastics and Engineering Plastics **04**  
(c) Explain Nano-materials with properties and some application **07**
- OR**
- Q.4** (a) Describe Non-Metallic Materials. **03**  
(b) Differentiate thermosetting and thermoplastics polymers with application. **04**  
(c) What is Bio-Degradable Plastics and explain the Bio-Degradation Plastics. **07**
- Q.5** (a) Define: **03**  
1) Modulus of Elasticity  
2) Plastic Deformation  
3) Hardness  
(b) Write a short note on Creep Tests **04**  
(c) Differentiate tension test and Compression test with neat diagram also write a short note on impact test **07**
- OR**
- Q.5** (a) Define: 1) Creep 2) Toughness 3) Ductility **03**  
(b) Write a short note on Tension Tests **04**  
(c) Define fatigue, & write down importance of fatigue test? Also, explain fatigue test theory. **07**

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