

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (New) EXAMINATION – WINTER 2018****Subject Code: 2132004****Date: 05/12/2018****Subject Name: Principles of Materials Science And Physical Metallurgy****Time: 10:30 AM TO 01:30 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) What is the signification of study of Metallurgy? **03**
(b) Define the following properties of engineering materials. (Any four) **04**
(1) stress (2) strength (3) ductility (4) fatigue (5) creep (6) stiffness
(c) What is micro examination of metal? What are the various steps required for such an examination? **07**
- Q.2** (a) State difference between a space lattice and a crystal structure. **03**
(b) Explain with neat sketches the arrangements of atoms in B.C.C and F.C.C structure. **04**
(c) Explain Edge dislocation with help of neat sketch. **07**
OR
(c) What is importance of structure – property- performance relationship? **07**
- Q.3** (a) Distinguish between Ductile and Brittle fracture with aid of appropriate sketches. **03**
(b) What is Modulus of elasticity? Draw stress- strain diagram for mild steel. **04**
(c) Explain Gibb's phase rule. **07**
OR
- Q.3** (a) Define the following terms (Any three) **03**
(1) Degree of freedom (2) Unary system and Binary system (3) Coring (4) Phase diagram
(b) Explain with the help of neat sketch the Allotropy of iron. **04**
(c) Explain TTT diagram with fully labeling. **07**
- Q.4** (a) Explain Eutectic Reaction. **03**
(b) What is the Heat treatment of steel? What is its objective? **04**
(c) Write the procedure for conducting Jominy Hardenability Test. **07**
OR
- Q.4** (a) Define Hardenability of steel. State factors that affect the Hardenability. **03**
(b) Write down on comparison of destructive and non destructive test. **04**
(c) Explain Induction hardening process also give application. **07**
- Q.5** (a) What is the application of Ultrasonic test? **03**
(b) Explain any one method of powder production in powder metallurgy. **04**
(c) Explain in brief sintering process **07**
- Q.5** (a) Differentiate between Carburizing and Nitriding. **03**
(b) Write the advantages and limitation MPT technique. **04**
(c) Draw and Explain iron – iron carbide diagram. **07**
