

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III • EXAMINATION – SUMMER 2013****Subject Code: 132101****Date: 04-06-2013****Subject Name: Elements of Material Science and Metallurgy****Time: 02.30 pm - 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) What are the factors you would like to consider for selection of material for a given application ? Explain in detail. **07**

(b) Give a broad classification of engineering materials giving at least three examples of materials in each class. **07**

Q.2 (a) Write a comprehensive note on structure, properties relationship in metals, ceramics, and polymers also indicate the type of bonding in these materials. **08**

(b) Now a days materials engineering is gaining a lot of importance. Justify the statement with examples / illustrations. **06**

OR

(b) Give some examples of advances that have taken place in the recent times in respect of materials and their properties. **06**

Q.3 (a) Explain MMC, PMC, CMC, and give examples. **06**

(b) Differentiate between **08**

1. Resilience and Toughness
2. Ductility and Malleability
3. Hardness and Wear resistance
4. Creep and Fatigue.

OR

Q.3 (a) Give a broad classification of electronic materials and explain the principle of electrical conduction based on the energy bands **08**

(b) Differentiate between n-type and p-type semi conductors. **06**

Q.4 (a) Explain the following: **08**

1. Rule of mixture 2. Cermet 3. E glass and S glass 4. Elastomer

(b) Differentiate between thermosetting and thermoplastic polymers. **06**

OR

Q.4 (a) What are the different types of metallic materials ? What is the difference between an alloy and a composite material ? **06**

(b) What is powder metallurgy ? Write advantage and limitations and applications of powder metallurgy. **08**

Q.5 (a) What is corrosion ? What are the different types of corrosion ? **06**

(b) Differentiate between cold working and hot working. **08**

OR

Q.5 (a) What are the ceramic materials ? Write short note on Traditional ceramic and Modern ceramic materials. **06**

(b) Differentiate between **08**

1. Co-polymerization and condensation polymerization
2. Elastic deformation and plastic deformation.
