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## GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER-VIII • EXAMINATION - SUMMER • 2015** Date:11/05/2015 Subject Code:182102 Subject Name: Selection of Materials and Failure Analysis Time: 10.30AM-01.00PM **Total Marks: 70 Instructions:** 1. Attempt all questions. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. (a) What is a failure analysis? What are the basic steps involved in performing a 07 **Q.1** failure analysis? List out various properties of materials. Describe strength in brief. 07 **(b)** 0.2 Explain the role of material engineer for selection of materials in Design **07** synthesis. (b) Explain how does availability of material& the cost of material affects the 07 selection process? Give suitable example Define stiffness & explain the criteria for selecting material for stiffness. 07 Define creep mechanism. What are the basic requirements for creep resistance? **07** 0.3 (a) Explain macro & micro fracture features of Ductile fracture. 07 **(b) Q.3** What are the basic criteria for selection of engineering materials? 07 (a) **(b)** Explain how material selection & material processing are related? Give 07 suitable example. 0.4 (a) Define hydrogen embrittlement of steel. Explain the mechanism. 07 Explain in detail the mechanism of stress corrosion cracking failure. 07 **(b)** OR What are the basic criteria for selection of material for corrosion & wear 0.4 (a) **07** resistance applications? Explain mechanism of Fatigue failure in brief. **07 (b) Q.5** (a) Discuss the case study of failure of auto component. 07 Explain macro & micro fracture features of brittle fracture. 07 **(b) Q.5** (a) Discuss the case study of failure due to wrong material selection **07** What are the basic requirements for selecting material for high temperature

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**(b)** 

process? Give suitable examples.

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