

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII(NEW) EXAMINATION – SUMMER 2019

**Subject Code:2182102**
**Date:15/05/2019**
**Subject Name:Material selection and Failure Analysis**
**Time:10:30 AM TO 01:00 PM**
**Total Marks: 70**
**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
<b>Q.1</b>	(a) Discuss common mode of fracture with its surface characteristics.	<b>03</b>
	(b) Discuss factor affecting on cost of basic materials.	<b>04</b>
	(c) Explain the criteria for selection of engineering materials.	<b>07</b>
<b>Q.2</b>	(a) Discuss briefly on Value added cost with suitable example.	<b>03</b>
	(b) Define stiffness? Discuss the criteria for selection of materials for stiffness.	<b>04</b>
	(c) Explain procedure for failure investigation.	<b>07</b>
	<b>OR</b>	
	(c) Explain the role of material engineer for selection of materials in Design synthesis.	<b>07</b>
<b>Q.3</b>	(a) Explain Creep mechanism. List out factor affecting creep.	<b>03</b>
	(b) Explain relationship between material selection and material processing	<b>04</b>
	(c) Which are different mechanical properties used for selection of material in engineering use. Explain Strength in detail.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Discuss briefly on Material selection for wear resistance.	<b>03</b>
	(b) Where materials with high strength-to-weight ratio are required? Discuss selection criteria and list the materials.	<b>04</b>
	(c) Explain macro & micro fracture features of Fatigue failure.	<b>07</b>
<b>Q.4</b>	(a) Give macro examination of ductile failure.	<b>03</b>
	(b) Define Fatigue. Explain fatigue failure mechanism.	<b>04</b>
	(c) Discuss the case study of failure of automobile component.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Mention and explain the most prominent combination of materials and environments which can lead to stress corrosion cracking.	<b>03</b>
	(b) List the properties required for bearings. Discuss the bearing materials.	<b>04</b>
	(c) Discuss in detail mechanism of ductile failure.	<b>07</b>
<b>Q.5</b>	(a) Discuss micro and macro features of fatigue failure.	<b>03</b>
	(b) Discuss mechanism of component failure by crevice corrosion.	<b>04</b>
	(c) Write basic characteristics of brittle failure and explain in brief.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) Discuss in brief elevated temperature fatigue.	<b>03</b>
	(b) Discuss mechanism of component failure by SCC.	<b>04</b>
	(c) Define hydrogen embrittlement of steel. Explain the mechanism of hydrogen induced cracking in the steels	<b>07</b>

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