Code No: 158AZ **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, September - 2022
FAILURE ANALYSIS
(Metallurgical and Materials Engineering)

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks
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1.a) Discuss about stress concentration factors.
b) Explain the Griffith criteria on fracture. [8+7]

2.a) Explain the critical condition for crack growth in Griffith criterion?
b) How do you calculate strain energy release rate? Explain. [8+7]

3.a) Explain how do you evaluate the fracture toughness?
b) Clearly mention the various factors that are responsible for getting environment assisted cracking in materials. [7+8]

4.a) How nucleation and propagation of cracks takes place in materials? How do you minimize?
b) Explain the theory of Linear Elastic Fracture Mechanics (LEFM). [8+7]

5.a) How does crack propagation occur in elastic-plastic materials?
b) What are the modes of crack propagation in plastic materials? How do you minimize crack propagation? [7+8]

6. Explain about the three variables in fracture mechanics that affect the design of a component. [15]

7. Discuss various conventional approaches to fatigue crack growth in reactive environment under cyclic loading. [15]

8.a) Discuss the failure mechanism of materials under fatigue loading.
b) Briefly explain the types of failures and its characteristics. [8+7]

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