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Total Number of Pages : 01

M.TECH

AR-18

M.TECH 1ST SEMESTER EXAMINATIONS(BACK), NOV/DEC 2019

MD, MMDPE1031

FATIGUE,CREEP AND STRUCTURE

Time: 3 Hours

Max Marks : 70

The figures in the right hand margin indicate marks.

PART-A

(10 X 2=20 MARKS)

1. Answer the following questions.

- Distinguish between “stress concentration factor” and “stress intensity factor”?
- What is strain hardening of creep?
- Distinguish between toughness and fracture toughness?
- How brittle fracture is different from ductile fracture?
- What is fracture toughness?
- Differentiate between Goodman and Soderberg curves?
- What is super plasticity? and what are the requirements for a material to exhibit super plastic behaviour?
- Explain the phenomenon of creep in metal?
- Define finite life and infinite life of fracture?
- How does fracture stress and mode of fracture vary with specimen thickness?

PART-B

(5 X 10=50 MARKS)

Answer any five questions from the following.

Q.2.

- Explain R .R. Moore’s and wholer fatigue experiment.
- Derive the relationship between strain energy release rate and stress intensity factor

Q.3.

- Explain stage I stage II and stage III fatigue crack growth.
- State and explain cumulative damage theory .

Q.4.

- Explain the process of “auto-frettaging” for the enhancement of fatigue strength of gun barrels?
- Distinguish between LEFM AND EPFM

Q.5.

- Discuss about creep material.
- Explain briefly Primary secondary and territory creep.

Q.6.

- Discuss the various mechanical and metallurgical methods for improvement of fatigue strength in metal?
- Explain the testing procedure and methods to determine K_{IC} ,the plain strain fracture toughness

Q.7.

- Explain briefly Griffith theory of brittle fracture and derive the Griffith equation for fracture stress in a plain stress and plain strain condition.
- Draw a typical creep curve and explain the various stages?

Q.8. Write short notes on

- Effect of stress concentration on fatigue
- High temperature alloys

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