

CBCS SCHEME

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15AE741

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019

Fatigue and Fracture Mechanics

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Briefly discuss on the procedure to obtain S-N curve and define endurance limit with neat sketch. (08 Marks)
b. Discuss on Goodman, Gerber and Soderberg relation with diagram. (08 Marks)

OR

- 2 a. Write short notes on Neuber's stress concentration factors with neat graph. (08 Marks)
b. Write short notes on: (i) Mean stress (ii) Notches (iii) Stress concentration factor (08 Marks)

Module-2

- 3 a. Explain Coffin-Masson's Relation with help of graph. (08 Marks)
b. Write short notes on: (i) Low cycle and high cycle fatigue (ii) Strain hardening and softening (08 Marks)

OR

- 4 a. Define cycle counting techniques and explain any one of them. (08 Marks)
b. Explain Minu's Rule importance in damage calculation in fatigue analysis. (08 Marks)

Module-3

- 5 Discuss in detail the phases of crack growth in fatigue life of structure with neat sketch. (16 Marks)

OR

- 6 a. Write short notes on imperfection in crystal arrangements and explain how dislocation causes crack nucleation. (08 Marks)
b. Write short notes on fatigue fracture surfaces with diagrams: (i) Striations (ii) Beach marks. (08 Marks)

Module-4

- 7 a. Define potential energy and surface energy of solids. (04 Marks)
b. Derive Griffith's criteria for Ductile materials with neat sketch. (12 Marks)

OR

- 8 a. Write short notes on effect of thickness on fracture toughness. (08 Marks)
b. Define Stress Intensity Factor (SIF) and fracture toughness. Write the value of typical geometrics with neat sketch. (08 Marks)

Module-5

- 9 Discuss about the fail safe and safe life philosophies with the help of factor of safety. (16 Marks)

OR

- 10 a. Write short notes on importance of fracture mechanics in aerospace. (08 Marks)
b. Write the applications of fracture mechanics to composite materials. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.