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Total Number of Pages: 2

B.Tech
PEME5410

8th Semester Regular / Back Examination 2016-17

FATIGUE, CREEP AND FRACTURE

BRANCH: Mech

Time: 3 Hours

Max Marks: 70

Q.CODE: Z208

**Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.**

- Q1** Answer the following questions: **(2 x 10)**
- a) Give example of stress reversals.
 - b) State the Goodman and Soderberg's criteria in fatigue?
 - c) What is the effect of flame hardening on fatigue?
 - d) How brittle fracture is different from ductile fracture?.
 - e) State the environmental effect on fatigue strength of materials.
 - f) What is J-integral ?
 - g) What is fracture toughness ?
 - h) Name the different mode of fracture with neat sketch.
 - i) Define creep.
 - j) What EPFM ?
- Q2** a) Discuss the effect of compressive cyclic stress on fatigue. **(5)**
- b) Briefly describe about Beam type of Fatigue test. **(5)**
- Q3** a) Briefly describe the effect of frequency and temperature in fatigue failure ? **(5)**
- b) Discuss the effect residual stresses in fatigue. **(5)**
- Q4** Describe how fatigue strength can be improved mechanical work. **(10)**
- Q5** a) Explain about the concept of cumulative fatigue damage. **(5)**
- b) Explain the Griffith theory of brittle fracture. **(5)**
- Q6** a) Discuss about Modes of fracture. **(5)**
- b) Discuss about the experimental procedure for determination of fracture toughness **(5)**

- Q7 (a)** Derive the relationship between strain energy release rate and stress intensity factor. **(5)**
- (b)** Describe about strain hardening and time hardening creep relaxation. **(5)**
- Q8 Write short notes on any two :** **(5x2)**
- a)** Fatigue crack propagation
 - b)** Corrosion fatigue.
 - c)** LEFM
 - d)** Standard ASTM Tests.