GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER III (OLD) – EXAMINATION – WINTER-2016

Su	Subject Code: 730902 Date:27/10/		
Su Tii Inst	bject ne:02 tructic 1. 2. 3.	 Name: Fracture Mechanics 2:30 pm to 05:00 pm Total Marks: ons: Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks. 	70
Q.1 Q.2	(a) (b) (a) (b)	Explain different modes of fracture with suitable example. What is the basic difference between yield and fracture based design. Derive the relation between K and G. Derive the ERR equation of double cantilever beam subjected to end moments.	07 07 07 07
Q.3	(b) (a) (b)	Derive the ERR equation of double cantilever beam using J integral approach when subjected to end moments. Explain Wastergaard approach of determining the SIF. Determine the SIF for Griffith crack	07 07 07
Q.3 Q.4	(b) (a) (b) (a) (b)	OR Explain William approach for determining the SIF. Discuss the plastic zone sizes of plane stress and plane strain cases. Derive the J integral for a cracked body. Compare Griffith and Inglis failure criteria. OR	07 07 07 07 07
Q.4 Q.5	(a) (b) (a) (b)	Prove that the J integral is path independent. Derive the equation for theoretical cohesive strength. Explain different mixed mode fracture criteria and discuss one of them in detail Discuss the experimental methodology for measuring the stress intensity factor in laboratory.	07 07 07
Q.5	(a) (b)	Explain Paris law for fatigue crack propagation. Discuss the experimental methodology for measuring the J integral in laboratory	07 07
