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JAYA GROUP OF INSTITUTIONS-THIRUNINRAVUR  
6<sup>th</sup> SEM – B.E. / B.Tech  
INTERNAL ASSESSMENT-II(MODEL EXAM-II)

Sub. Name: High Temperature Materials  
Sub. Code: AE 2354  
Duration: 180 minutes

Date: 09-03-2015  
Branch: Aeronautical  
Max.Marks: 100

**PART-A (10x2=20)**

1. Define Fracture and types of fracture.
2. Explain the term Creep Ductile Fracture and Brittle Fracture.
3. What is meant by Equicohesive Temperature (ECT)?
4. Define cleavage fracture.
5. What is fracture toughness?
6. Define Transgranular fracture & Intergranular fracture
7. Define oxidation process.
8. State Pilling Bed worth theory.
9. What are the Kinetic Laws of Oxidation?
10. Name some oxidation resistance materials.

**PART-B (5x16=80)**

11)a. Derive an expression for cleavage  $I''$  failure based on Orowan and Griffith Theory and comment how the various terms in these equations are responsible for strengthening and toughening the materials.

(or)

11)b. Briefly explain the theory of Ductile to Brittle transition with neat diagram.

12)a. Draw fracture maps for a bcc material or an oxide and explain various regimes.

(or)

12)b. Analyse technically the following fractures

- (i) Trans Granular Ductile fracture.
- (ii) Inter granular creep fracture.
- (iii) Pure diffusional Fracture.
- (iv) Rupture.

13)a. What are the various types of fracture? Classify the fracture on the basis of type of loading extent of deformation and appearance.

(or)

13)b. Explain

- i) Miners Law
- ii) Bauschinger Effect

- iii) Blue Brittleness
- iv) Orange Peel Effect

14)a. What are the kinematics principles in the Oxidation? Discuss in detail.  
(or)

14)b. Explain Fracture toughness and Methods of Improving Toughness

15)a. i) Briefly explain the mechanism of oxidation?  
ii) Explain Pilling-Bedworth ratio.

(or)

15)b. What are the Effect of Alloying Elements on Hot Corrosion?