

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

Sub. Name: High Temperature Material

Date: 09 | 04 | 2018

Sub. Code: AE 2354

Branch: Aeronautical

Duration: 180 minutes

Max.Marks: 100

**PART-A (10 x 2 =20)**

1. Why the rate of creep is more at elevated temperature.
2. Which types of materials are preferred for creep application?
3. What are the deformation modes?
4. Draw a typical creep curve and mark the various stages.
5. Derive a relation between strength and dislocation density.
6. Name two metallurgical factors that affect creep rate.
7. Define rupture life of creep?
8. Differentiate between ICF & TCF
9. What is fracture toughness?
10. State pilling-bedworth theory

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

11. A) Discuss the mechanism of creep deformation briefly with necessary sketches?  
(or)

B) i) Briefly explain the three stages of creep with a creep curve.

ii) What are the structural changes involved during creep? Explain in detail.

12. A) i) Briefly explain the influence of brittle & ductile materials on creep.

ii) Discuss the conditions favourable for creep cavitation.

(or)

B) i) Derive the expressions of rupture life of creep.

ii) Explain monkman-grant relationship.

13. A) Analyse technically the following fractures

- i) Transgranular ductile fracture.
- ii) Intergranular Creep fracture
- iii) Pure diffusional fracture
- iv) Rupture

(or)

B) Draw fracture maps for a FCC material or an oxide and explain various regimes.

14. A) What are the kinematics principles in the oxidation? Discuss in detail.

(or)

B) Explain the various stages of hot corrosion with mechanism & superalloys?

15. A) Explain strengthening of Iron base, Nickel base and cobalt base alloys.

(or)

B) Explain

i) Intermetallics

ii) Embrittlement

iii) High Temperature Ceramics