Register Number……

B.E. DEGREE EXAMINATIONS: NOVEMBER 2009

Third Semester

AERONAUTICAL ENGINEERING

U07AR303: Aircraft Materials and Processes

Time: Three Hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 × 1 = 10 Marks)

1. A factors should be confidence in selecting an material is

   a) Strength b) Malleability c) Stiffness d) Availability of materials

2. Hardness testing is associates with

   a) Strength b) Fatigue c) Ductility d) Shore Scleroscope

3. According to Indian standard specifications a grey cast iron designated by FG 200 "means that:

   a) Carbon content is 2% b) Max compressive strength is 200 Mmm^2

   c) Max tensile strength is 200 N/mm^2 d) Max Shear Stress 200 N/mm^2

4. Non – ferrous metals may be used for

   a) Resistance to corrosion b) High strength in c) More elasticity d) Resistance.

5. Corrosion can be prevented by

   a) Adding alloys to base metal b) Increasing strength

   c) Increase in fatigue strength d) Use of inhibitor

6. A systematic study of fatigue can be made by:

   a) Axial Loading b) Tensile Loading c)Compression Loading d)Stress–based approach.

7. Fracture Mechanism maps are diagrams which show the dominance of:

   a) Temperature b) Viscosity c) Strain d) Clearage

8. The voids grow by

   a) Viscosity b) Plasticity c) Creep d) Diffusion

9. Intergrannular fracture occurs due to:

   a) High temperature b) Oxidation Damage c) Plasticity d) Low Temperature

10. The most common non – metallic coatings are:

    a) Paints b) Oxygen c) Nitrogen d) Chlorine

PART B (10 × 2 = 20 Marks)

11. Give two basic requirements to select a material
12. What are the terms associated with hardness testing
13. Briefly explain the specifications of SAE.
14. What is MIL specification? Give example.
15. What are the various properties of Non- ferrous alloys?
16. What are the applications of Aluminum alloys?
17. What is Galvanic corrosion?
18. How to combat cornering?
19. Define Creep.
20. With a sketch explain the various stages of creep.

PART C (5 × 14 = 70 Marks)

21 a) List the materials used for a Gas turbine engine parts and briefly describe their properties.

(OR)

b) Describe

i) Hardness testing ii) Tensile testing (4+3)

22 a) What is the effect of adding Ni, cr, Mn to steel? Also explain in what percent age should the materials to be added.

(OR)

b) Describe the properties, composition of Iron -based alloys (Super alloys)

23 a) How can Aluminium alloys be strengthened.

(OR)

b) Discuss the properties and applications of titanium alloys on the aircraft industry.

24 a) Explain in detail the methods to prevent corrosion.

(OR)

b) What are the factors influencing corrosion rate.

25 a) What are the various factors influence the functional life of components at elevated temperatures.

(OR)

b) Explain

i) Clearage Fracture ii) Intergrannualar fracture (4+3)

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