

**B.E DEGREE EXAMINATIONS: NOV/DEC 2010**

Third Semester

**AERONAUTICAL ENGINEERING**

U07AR303: Aircraft Materials and Processes

**Time: Three Hours**

**Maximum Marks: 100**

**Answer ALL Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. First material known to be used by man  
(a) Cotton    (b) Bronze    (c) Iron    (d) Rock
2. Strong and ductile materials  
(a) Polymers    (b) Ceramics    (c) Metals    (d) Semiconductors
3. Detrimental property of a material for shock load applications  
(a) High density    (b) Low toughness    (c) High strength    (d) Low hardness
4. Figure out the odd statement about ceramics in the following  
(a) Good insulators of heat and electricity  
(b) Usually less dense than metals  
(c) Ductile in nature  
(d) Contains both metallic and nonmetallic elements
5. Cleavage fracture appears  
(a) Bright    (b) Dull    (c) Difficult to identify    (d) None
6. Following impurity decreases DBTT for steels  
(a) Mn    (b) P    (c) Si    (d) Mo
7. Fracture voids usually form at  
(a) Inclusions    (b) Second phase particles    (c) Grain boundary triple points    (d) All
8. Time dependent recoverable deformation under load is called \_\_\_\_\_ deformation.  
(a) Elastic    (b) Anelastic    (c) Elastic after-effect    (d) Visco-elastic
9. Creep mechanism that is operational at stresses  $10^{-2} > \sigma/G > 10^{-4}$  \_\_\_\_\_.  
(a) Dislocation creep    (b) Dislocation glide    (c) Diffusion creep    (d) GB sliding
10. Time dependent permanent deformation is called \_\_\_\_\_.  
(a) Plastic deformation,    (b) Elastic deformation,    (c) Creep,    (d) Anelastic deformation

**PART B (10 × 2 = 20 Marks)**

11. Explain non-ferrous Metals and give two examples:
12. Give some application of super alloys in aerospace:
13. What is natural resin?
14. Explain the purpose of using primer before painting:
15. List out the purposes of the fabric covering of an aircraft:
16. What are the agents presents during doping process?
17. Explain the purpose of dope in aircraft:
18. Define composites material:
19. Define fiber glass:
20. What are the various types of fractures?

**PART C (5 × 14 = 70 Marks)**

21. a) What are the testing methods for aircraft materials?  
(OR)  
b) Explain the inspection methods for airplane structure parts.
22. a) Explain in detail of plain carbon steels & alloy steels.  
(OR)  
b) Explain the types of special steels.
23. a) Explain the theory of heat treatment process.  
(OR)  
b) Explain Magnesium & titanium alloys and also explain its uses in aircraft parts.
24. a) What are the various methods of corrosion prevention employed in aviation industries?  
(OR)  
b) What are the types of corrosion occurring in aero plane parts, components, assemblies, sub assemblies, Explain in brief each of them?
25. a) What are the factors influencing functional life of components at elevated temperatures?  
(OR)  
b) What are the testing methods for creep, fracture and fatigue?

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