

B.E. DEGREE EXAMINATIONS: OCTOBER/NOVEMBER -- 2008

Third Semester

AERONAUTICAL ENGINEERING**U07AR 303 Aircraft Materials and Processes****Time : Three Hours****Maximum Marks : 100****Answer ALL Questions:-****PART A (20 x 1 = 20 Marks)****Choose the appropriate choice (One out of four choices)**

1. Commonly used material in aircrafts is
A) Pure aluminum B) Aluminum Alloy C) Mild Steel D) Stainless steel.
2. The basic requirement for choosing a material is
A) Hardness B) Strength C) Toughness D) Strength to weight ratio.
3. Toughness is the capacity to
A) Resist fracture B) Resist induntation C) To absorb energy
D) Resistance to Corrosion.
4. Endurance limit corresponds to
A) Fatigue failure limit B) Yield stress C) Ultimate stress D) Resistance to corrosion.
5. Super alloys are
A) Hard B) Stiff C) Corrosion resistant
D) High Proportionality limit stress.
6. Low carbon steels have carbon content
A) 0 to 0.1 B) 0.1 to 0.3 C) 0.3 to 0.7 D) 0.7 to 2.2
7. Steel used to get magnets will have the alloying elements
A) Magnesium B) Nickel C) Chromium D) Silicon
8. Steel having good weldability is
A) Molybdenum steel B) Nickel Steel C) Chromium Steel D) Silicon Steel
9. Main elements in inconel are
A) Nickel and Silicon B) Nickel and Chromium C) Nickel and Copper
D) Copper and Silicon.
10. Main element of Monel are
A) Nickel and Copper B) Nickel and Chromium C) Copper and Chromium
D) Copper and Magnesium
11. Duralumin (aircraft aluminum) contains alloying elements
A) Cu and Mn B) Cu and Mg C) Cu and Si D) Mn and Si
12. Solution heat treated aluminum alloy is represented as
A) T2 B) T3 C) T4 D) T5
13. Corrosion between dissimilar metals is known as
A) Galvanic corrosion B) Stress corrosion C) Oxidation corrosion
D) Mill Scaling.
14. Galvanizing of mild steel components is by dipping them in molten
A) Copper B) Nickel C) Tin D) Chromium

15. Main alloying component of stainless steel is
 A) Zinc B) Nickel C) Zinc D) Chromium
16. Gun metal consists chiefly the alloying elements
 A) Cu, Tin, Zn B) Cu, Mn, Zn C) Cu, Si, Zn D) Cu, Pb, Zn
17. Standard creep rate per hour in percentage is
 A) 0.0001 B) 0.001 C) 0.01 D) 0.1
18. Creep rate is a function of
 A) Stress and Temperature B) Stress C) Temperature D) Rate of loading
19. Cup and cone fracture occurs in materials which are
 A) Brittle B) Ductile C) Malleable D) Ductile and Malleable
20. Alcladings is done to
 A) Increase strength B) For Corrosion resistance C) Increase hardness
 D) Highly Ductile and Malleable.

PART B (5 x 16 = 80 Marks)

21. a) i) List the non ferrous materials used in aerospace applications (6)
 ii) Briefly explain the different parameters such as hardness etc encountered in material characterization. (10)
- OR**
21. (b) Briefly explain the different parameters to be considered to choose a material. (16)
22. a) i) What is hardenability? Explain (4)
 ii) Briefly explain the different heat treatment process (12)
- OR**
22. b) i) Explain the special characteristics of super alloys. Give examples (6)
 ii) Explain the advantages of using ceramic coating over metal alloy components (10)
- 23) a. i) Explain with example precipitation hardening (4)
 ii) Briefly explain the heat treatments used for aluminum alloys and mention their applications (12)
- OR**
- 23) b) Explain the different magnesium and titanium alloys and their applications (16)
- 24) a.) Explain the different types of corrosions and the protective methods used of each (16)
- OR**
- b) i) Explain cadmium plating and its advantages (8)
 ii) Explain chromium plating and its advantages (8)
- 25) a) Bring out the differences between creep and fatigue. Discuss the effect of increased temperature then (16)
- OR**
- b) Sketch and explain S-N curves and their uses under multiple loading (16)
