



AC 8005 -AEROSPACE MATERIALS

PART -B

UNIT-1

1. Classify solid materials based upon their atomic / crystalline structure and give the examples (MAY/JUNE 2016)
2. Explain the X-ray diffraction technique and explain its role in the study of materials (MAY/JUNE 2016)
3. Explain the structure of solid materials
4. Explain the different types of point defects (NOV/DEC 2016)
5. Explain about the crystallography miller indices.
6. Derive and show that the packing efficiency of FCC crystal structure is more than BCC crystal structure (NOV/DEC 2016)
7. List the general requirements of materials used in aerospace applications. (NOV/DEC 2016)
8. With the help of neat stress - strain curve, contrast the mechanical behavior of brittle and ductile material in a tensile test (MAY/JUNE 2016)
9. Explain the bauchinger effect in the mechanical behavior of a material (MAY/JUNE 2016)
10. Explain the following (i) Bauchinger's effect, (ii) strain hardening (NOV/DEC 2016)

UNIT-2

11. What are the typical elastic constant of the mechanical behavior of a material
12. Draw and explain the linear and non linear curve for ductile and brittle
13. Explain the properties of ceramic materials.
14. What are the various types of fracture? Classify the fracture on the basis of type of loading extent of deformation and appearance.
15. What are the structural changes involved during creep? Explain in detail.

16. Give a comparative study of materials used in aviation industries
17. Describe fatigue, its mechanism, its consequences and what can be done to the material in order to improve fatigue resistance.
18. Briefly explain the three steps of creep with a creep curve
19. What is super plasticity? Explain super plastic forming of aluminium alloys.
- (MAY/JUNE 2016)
20. Describe different heat treatment processes available for aluminium alloys and state their respective purposes.

(MAY/JUNE 2016)

UNIT-3

21. Write short note on the following topics
- i. Corrosion and different types of corrosion
 - ii. Stress corrosion cracking
 - iii. Corrosion resistance materials used for air and space vehicles and their properties
- (MAY/JUNE 2016)
22. Explain the various types of corrosion that occurs in metallic materials.
- (NOV/DEC 2016)
23. Discuss the hardening and normalizing heat treatment processes that are applied to carbon steels.
- (NOV/DEC 2016)
24. What are the effect of corrosion on mechanical properties of materials?
- (NOV/DEC 2016)
25. Describe the shape memory effect and give examples of shape memory alloys
- (MAY/JUNE 2016)
26. List a few examples of the use of metal matrix composite materials in air/space vehicles. Explain a fabrication process for a metal matrix composite part
- (MAY/JUNE 2016)
27. What do you mean by composites and the classification of composites?
28. Explain the open mould process of composite materials (MAY/JUNE 2016)
29. Explain the close mould process of composite materials (MAY/JUNE 2016)
30. Explain the different types of alloying and effects alloy treatment

UNIT-4

31. How is high temperature materials classified? And explain the methods of production.

(NOV/DEC 2016)

32. Discuss the various methods employed to determine the mechanical properties of materials at high temperature.

(NOV/DEC 2016)

33. Explain strengthening of cobalt-base super alloys.

34. Briefly explain the major phases of nickel-base alloys

35. Analyze how the processing parameters can influence the mechanical properties of super alloys at high temperatures.

36. Explain in detail about the factors influencing functional life of components at elevated temperatures.

37. Describe the damage investigation methods.

38. What are the unsafe acts and unsafe conditions in electric arc welding process?

39. Explain the purpose of jigs and fixtures in welding?

40. Explain the processes of soft soldering, hard soldering and brazing.

UNIT-5

41. Explain the common method of cementing transparent plastics.

42. What is meant by reverse technology and how is it useful in aircraft maintenance?

43. Discuss about the maintenance of plastic components.

44. What is a composite? How do the composites differ in structure from metals?

45. Describe in brief the different non-destructive inspection methods employed in composites.

46. Describe in brief the three basic methods to repair aircraft composite parts.

What are the advantages and disadvantages of these methods?

47. Explain the procedure to carry out a repair if damage penetrates the skin and the core material.

48. What are the special precautions to be adopted while carrying out composite structural repairs?

49. Explain in detail about the inspection and repair of composite components.

50. Explain about the methods of testing?