CBCS SCHEME

USN | | | | | | | | | | |

18AE45

Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Aircraft Materials Science

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Define the following: i) Critical Range ii) Normalizing iii) Tempering iv) Carburizing v) Case Hardening. **(10 Marks)**

b. List out the selection criteria for materials to use in criteria for materials to use in aircraft. **(10 Marks)**

OR

2 a. Discuss about the solution heat treatment for 'Aℓ' array. **(10 Marks)**

b. Briefly explain about the heat treatment of mild carbon steel. **(10 Marks)**

Module-2

3 a. Define powder metallurgy process and briefly explain the steps involved in it and also state the advantages and limitations of the same. **(10 Marks)**

b. Explain about the heat treatment process for Ni-based super alloys. **(10 Marks)**

OR

4 a. Draw a neat sketch explain Filament winding manufacturing process of composite materials. **(10 Marks)**

b. Brief about metal matrix composites based on Aℓ and Mg **(10 Marks)**

Module-3

5 a. Classify polymers and explain briefly about thermosetting and thermoplastic polymers. **(10 Marks)**

b. Write the properties and applications of ceramic materials with examples. **(10 Marks)**

OR

6 a. Why transparent plastics preferred over gasses and write its common applications. **(10 Marks)**

b. Briefly discuss about the adhesives and sealants used in the aircraft. **(10 Marks)**

Module-4

7 a. Explain briefly about the ablation process on the materials and give its aerospace applications. **(10 Marks)**

b. Explain about the joining process of wood with different types of glues. **(10 Marks)**

OR

8 a. Draw a neat sketch and explain different terminology related to aircraft fabrics and also mention the applications of fabrics. **(10 Marks)**

b. Write a purposes of aircraft painting and explain different types of paints. **(10 Marks)**

Module-5

9 a. Discuss in detail about the metallic surface coating on the materials. **(10 Marks)**

b. List and explain primary ways to control corrosion. **(10 Marks)**

OR

10 a. Write the materials used for the construction of Rockets and Missiles with their properties. **(10 Marks)**

b. Explain about the types of propellant in detail. **(10 Marks)**

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