

# 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.

### 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 aircraft. (10 Marks)

OR

- 2 a. Discuss about the solution heat treatment for 'Al' alloy. (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 glasses 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)

\*\*\*\*\*

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.