

B. Tech. (Aeronautical Engg.) (Semester – 5th)
AIRCRAFT MATERIALS AND PROCESSES
Subject Code: BANES1503
Paper ID: [18110224]

Time: 03 Hours**Maximum Marks: 60****Instruction for candidates:**

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A**(2 marks each)**

Q1. Attempt the following:

- a. Explain the importance of strength/weight ratio of materials for Aerospace vehicles structures?
- b. State the methods used for heat treatment of steel.
- c. Define the terms creep and fatigue.
- d. What is spark erosion, and how is it utilized in the fabrication of aerospace parts?
- e. Discuss the functions of matrix materials in composite structures.
- f. Describe the effects of alloying elements on the microstructure and mechanical properties of steel alloys used in aircraft manufacturing.
- g. Discuss the importance of considering temperature variations in material selection for aerospace applications.
- h. Describe the properties of magnesium alloys and their applications in aerospace vehicles.
- i. How do composite materials contribute to the weight reduction and fuel efficiency of modern aircraft?
- j. Explain the principle of High-energy rate forming.

Section – B**(5 marks each)**

- Q2. Write a short note on factors affecting choice of material for different parts of an airplane.
- Q3. Give details of various types of composite materials and also explain the properties of carbon fiber.
- Q4. Explain about Hydroforming technique.
- Q5. Write the composition, advantages and application of Inconel Monel & K-Monel alloys.
- Q6. Describe the manufacturing process of honeycomb structures and their applications in aircraft.

Section – C**(10 marks each)**

- Q7. How do advancements in materials technology influence the design and manufacturing processes of aircraft?
- Q8. Explain the significance of metal joining processes in the construction of aircraft and aero engine parts. How do these processes contribute to the overall performance and reliability of aerospace components?
- Q9. Classify heat resistant materials. Explain their properties and applications of any one category.