

# CBCS SCHEME

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18AE34

## Third Semester B.E. Degree Examination, Dec.2023/Jan.2024 Elements of Aeronautics

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. With help of the time line, briefly explain the early history of aviation. (10 Marks)  
b. Explain the aircraft axis systems and the control surfaces responsible for the aircraft motion. (10 Marks)

OR

- 2 a. With neat sketches, explain the construction of fuselage structures. (10 Marks)  
b. Write a short note on the material used in various aircraft applications. (10 Marks)

### Module-2

- 3 a. With help a neat sketch, explain the airfoil geometry in detail. (10 Marks)  
b. Derive the equation for speed of sound and illustrate its significance. (10 Marks)

OR

- 4 a. Define Drag. Explain the different types of drag in detail. (10 Marks)  
b. Explain the following : i) Aerodynamic centre ii) Aspect ratio iii) Centre of pressure  
iv) Zero lift condition v) Mach number. (10 Marks)

### Module-3

- 5 a. Explain the classification of power plants in detail. (10 Marks)  
b. With neat sketch, explain the working of a turbo fan engine. Explain the merits and demerits of the same. (10 Marks)

OR

- 6 a. Explain the principles of Thrust augmentation and different types in it. (10 Marks)  
b. Compare the merits and demerits of air craft reciprocating engine, turboprop, turbo fan and turbojet engines. (10 Marks)

### Module-4

- 7 a. Explain the static and dynamic stability. (10 Marks)  
b. Define degrees of freedom for an aircraft and explain the forces acts on an aircraft in flight. (10 Marks)

OR

- 8 a. With suitable graphs, explain the following performance characteristics of aircrafts.  
i) Effect of altitude on power required and available  
ii) Power required and available for a propeller driven piston engine and jet engine aircraft. (10 Marks)  
b. Explain the basics of aircraft control surfaces and describe longitudinal and roll stability in detail. (10 Marks)

### Module-5

- 9 a. Describe the environment control system in detail. (10 Marks)  
b. Explain the hydraulic system and their applications in aircraft. (10 Marks)

OR

- 10 a. With help of neat sketches, explain the flight control system in detail (any one) (10 Marks)  
b. Write a short note on : i) Communication system ii) Navigation system. (10 Marks)

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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.