



# CBCS SCHEME

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21AE34

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 a neat sketch explain Aircraft Axis System. (10 Marks)
- b. Explain with neat sketch, the principle of operation of helicopter, their parts and functions. (10 Marks)

OR

- 2 a. Explain with neat sketch Monoque, Semimonoque and truss structure of aircraft. (10 Marks)
- b. Describe about typical wing and fuselage structure with neat diagrams. (10 Marks)

### Module-2

- 3 a. Define speed of sound and prove that  $a = \sqrt{\gamma RT}$  (10 Marks)
- b. Write in detail about the airfoil nomenclature, with sketches. (10 Marks)

OR

- 4 a. Explain with neat graph lift curve and drag curve. (10 Marks)
- b. Explain Bernoulli's theorem and prove that  $p_1 + \frac{1}{2}\rho_1 V_1^2 = p_2 + \frac{1}{2}\rho_2 V_2^2$  (10 Marks)

### Module-3

- 5 a. Describe the principle of operation of Turbofan engine with neat diagram. (10 Marks)
- b. With a neat sketch explain scram jet engine. (10 Marks)

OR

- 6 a. Draw the P-v and T-S diagram for Brayton cycle and also derive the expression for efficiency. (10 Marks)
- b. What is thrust augmentation? Explain different methods of thrust augmentation. (10 Marks)

### Module-4

- 7 a. Define stability. With a neat sketch explain static and dynamic stability. (10 Marks)
- b. In detail explain the effects of flaps and slats on lift. (10 Marks)

OR

- 8 a. Explain with neat sketch inverted maneuvers of aircraft. (10 Marks)
- b. Give details about effects of correct and incorrect angles of bank. (10 Marks)

### Module-5

- 9 a. Draw and explain about typical pneumatic system of an aircraft. (10 Marks)
- b. Explain with neat diagram aircraft fuel system. (10 Marks)

OR

- 10 a. In detail explain aircraft navigation system. (10 Marks)
- b. Explain about primary and secondary controls used in cockpit. (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.