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# Third Semester B.E. Degree Examination, Dec.2019/Jan.2020 Elements of Aeronautics

BTime: 3 hrs.

Max. Marks: 100

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

## Module-1

1 a. Explain with net sketch, the air craft motions. (10 Marks)

b. Explain with net sketch, the principle 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. Explain is details with application metallic and non-metallic materials used in aircraft.

(10 Marks)

## Module-2

3 a. Write a details about the airfoil nomenclature, with sketches. (10 Marks)

b. Explain (i) Aerodynamic Centre (ii) Centre of Pressure (iii) Aspect Ratio. (10 Marks)

## OR

4 a. Explain with neat graph lift-curve and Drag curve. (12 Marks)

b. An airfoil of chord length 2m and span 15m has an angle of attack  $\alpha = 6^{\circ}$ . The airfoil is moving with a velocity of 80m/sec in air whose density is  $1.25 \text{kg/m}^3$ . Find the weight of the airfoil and the power required to drive it. The value of coefficient of drag and lift are 0.03 and 0.5 respectively.

## Module-3

5 a. Describe principle of operation of Turbofan engine with neat diagram. (10 Marks)

b. Compare merits and demerits of Turbo prop Turbojet and Turbofan engine. (10 Marks)

#### OR

a. Explain with neat sketch Brayton cycle and its applications in jet engine. (10 Marks)

b. What is thrust augmentation? Explain different types of thrust augmentation method.

(10 Marks)

#### Module-4

7 a. What is Stability? Explain with neat sketch static and Dynamic stability. (10 Marks)

b. Explain with neat diagram: i) Flap and Slats ii) Control Tabs. (10 Marks)

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a. Explain with neat sketch Turning flight performance.

(10 Marks)

b. Explain with neat graph i) Power curve ii) Maximum and Minimum speed for horizontal flight at a given attitude. (10 Marks)

#### Module-5

9 a. Explain with neat diagram aircraft fuel system. (10 Marks)

b. Explain in details oxygen system requirements.

(10 Marks)

#### OR

10 a. With the help of block diagram, explain light aircraft electrical system. (10 Marks)

b. Write short notes on: i) Air Speed Indicator ii) Accelerometer. (10 Marks)

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