

CBCS SCHEME

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18AE71

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Aircraft Stability and Control

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define and explain Static Longitudinal Stability with Stability criteria. (10 Marks)
b. Explain Elevator required for Landing and Elevator power. (10 Marks)

OR

- 2 a. Explain the contribution of Furelags , wing , Tail and Airframe on Static Longitudinal Stability. (10 Marks)
b. Explain Trim condition and Stick fixed neutral points. (10 Marks)

Module-2

- 3 a. Explain Control Surface floating characteristics and Aerodynamic balance. (10 Marks)
b. Explain Stick Free Neutral point and Stick force gradient in Unaccelerated Flight. (10 Marks)

OR

- 4 a. Explain Hinge Moment Parameters and Trim tabs. (10 Marks)
b. Explain Restriction on aft center of gravity of an Aircraft. (10 Marks)

Module-3

- 5 a. Explain Coupling between Rolling and Yawing moments and Adverse yaw effects. (10 Marks)
b. Explain Rudder lock and Dorsal fin in directional control. (10 Marks)

OR

- 6 a. Explain One Engine Inoperative condition in detail. (10 Marks)
b. Explain in detail about weather cocking effect. (10 Marks)

Module-4

- 7 a. Explain Orientation and position of the Airplane in detail. (10 Marks)
b. Explain Aerodynamic force and moment representation. (10 Marks)

OR

- 8 a. Explain Gravitational and Thrust forces acting on the Airplane. (10 Marks)
b. Derive Derivation of rigid body equations of motion. (10 Marks)

Module-5

- 9 a. Explain Phugoid motion and Short period motion. (10 Marks)
b. Explain Cooper – Hooper Scale and Side – Slip excursion. (10 Marks)

OR

- 10 a. Explain Flying qualities in pitch and effect of Wind shear. (10 Marks)
b. Explain Dynamic lateral and Directional stability. (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.