



CBCS SCHEME

15AE743

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 Helicopter Dynamics

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Derive an expression for Thrust and Power Coefficient. (08 Marks)
b. Explain Rotor Solidity ratio, blade loading and Figure of Merit. (08 Marks)

OR

- 2 a. Define Disc Loading, Power Loading. (08 Marks)
b. Derive an expression for equilibrium about flapping Hinge. (08 Marks)

Module-2

- 3 a. What is Ground Effect? (08 Marks)
b. Explain Helicopter turning with and without coning of the rotor blades. (08 Marks)

OR

- 4 a. What is the effect of Gross Weight during forward flight? (08 Marks)
b. What is Auto Rotation? (08 Marks)

Module-3

- 5 a. Effect of Reynold's number and Mach number on rotor air foil dynamics. (08 Marks)
b. Discuss Rotor wake in forward flight. (08 Marks)

OR

- 6 a. What are the flow visualization technique used to find rotor wakes? (08 Marks)
b. What is vortex perturbation and instability? (08 Marks)

Module-4

- 7 a. Discuss forward speed disturbance. (08 Marks)
b. Discuss tail rotor control. (08 Marks)

OR

- 8 a. Discuss static stability of Helicopter. (08 Marks)
b. Discuss main rotor control. (08 Marks)

Module-5

- 9 a. Discuss the empenage of helicopter. (08 Marks)
b. What is NOTAR? (08 Marks)

OR

- 10 a. Explain the factors affecting the rotor diameter and tip speed of Main Rotor. (08 Marks)
b. Discuss high speed roto craft. (08 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.