

# GBCS SCHEME

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18AE81

## Eighth Semester B.E. Degree Examination, July/August 2022 Flight Vehicle Design

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Explain the design process of an aircraft with relevant flowchart. (15 Marks)  
b. Estimate the takeoff weight build up and explain it. (05 Marks)

OR

- 2 a. Derive an expression for wing loading effect on flight ceiling and glide rate. (12 Marks)  
b. Define thrust to weight ratio. Give the expression for  $\frac{T}{W}$  for propeller and jet airplanes. (08 Marks)

### Module-2

- 3 a. Write short notes on: (i) V-n diagram (ii) Gust Envelope (12 Marks)  
b. Explain conic lofting procedure with neat sketches. (08 Marks)

OR

- 4 a. Write short note on wing and tail initial sizing with neat sketch. (10 Marks)  
b. With neat sketch and equations, explain the concept of wing-tail layout and loft. (10 Marks)

### Module-3

- 5 a. Discuss the installed thrust correction for turbojet engine with neat graph. (10 Marks)  
b. Explain the selection criteria of propulsion system of an aircraft. (10 Marks)

OR

- 6 a. Discuss about the take-off analysis and landing analysis with neat sketch. (15 Marks)  
b. Write a short note on balanced field length. (05 Marks)

### Module-4

- 7 a. Describe the handling qualities of an aircraft Cooper-Harper Rating scale. (12 Marks)  
b. Write short notes on environmental constraints of general aviation. (08 Marks)

OR

- 8 a. Explain longitudinal stability and lateral stability criteria with relevant graphs and equations. (10 Marks)  
b. Explain the contribution of main wing towards lateral stability. (10 Marks)

### Module-5

- 9 a. What is Radar? Explain different types of Radar system (any two) with relevant sketch. (16 Marks)  
b. Write a short note on material selection for a typical aircraft. (04 Marks)

OR

- 10 Explain the following with neat sketch:  
a. Flight control system  
b. Landing gear and subsystem (20 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.