CBCS SCHEME

USN | | | | | | | | | | |

21AE641

Sixth Semester B.E. Degree Examination, June/July 2024
Flight Vehicle Design

Time: 3 hrs. Max. Marks: 100

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

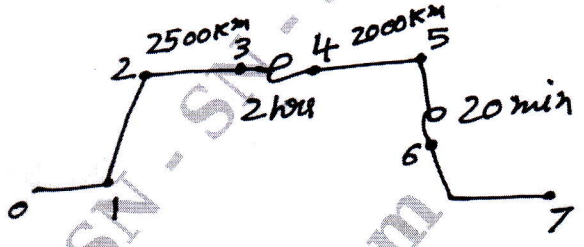
Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain Aircraft design process, with a neat block diagram. **(10 Marks)**

b. Consider a typical jet transport aircraft with L/D = 18, warm up and take off fuel fraction is 0.985 , Cruise and Loiter details are as shown in Fig. Q1(b). For Cruise ; C = 0.5/hr , V = 0.6M and for Loiter ; C = 0.4/hr. Landing fuel fraction is 0.995. Calculate the fuel fraction estimation. **(10 Marks)**

Fig. Q1(b)



OR

2 a. Explain the Wing loading effect on climb. **(10 Marks)**

b. Explain the Wing loading effect on take off and landing. **(10 Marks)**

Module-2

3 a. What are Quantitative Fuselage shapes? **(10 Marks)**

b. Draw a typical Vn diagram and gust envelop. Emphasize the significance of the curves involved. **(10 Marks)**

OR

4 a. Explain how wetted area is determined. **(10 Marks)**

b. Briefly explain various tail arrangements, with neat sketches. **(10 Marks)**

Module-3

5 a. Describe the installed thrust corrections for Turbo jet engine. **(10 Marks)**

b. Explain the spread sheet structure for Turbojet engine sizing. **(10 Marks)**

OR

6 a. Sketch the various phases of landing and arrive at equation for lending ground roll distance. **(10 Marks)**

b. Explain the Passive lift enhancement technique with neat sketches. **(10 Marks)**

Module-4

7 a. Discuss about the pitching moment generated from major components of Aircraft during longitudinal static stability with neat sketch. **(10 Marks)**

b. Discuss Lateral directional stability of Aircraft with moment equations. **(10 Marks)**

OR

8 a. Explain the procedure for Rudder sizing. **(10 Marks)**

b. Describe the handling qualities of an Aircraft by Cooper Harper rating scale. **(10 Marks)**

Module-5

9 a. Briefly explain the weapon carriage on military Aircraft with neat sketches. Also explain missile launching. **(10 Marks)**

b. Sketch and explain four commonly used lending gear arrangements. **(10 Marks)**

OR

10 a. Explain Flight Control System. **(10 Marks)**

b. Explain Anti icing – deicing system in Aircraft. **(10 Marks)**

* * * * *

VTU-22-08-2024 08:49:49am
SN - SN - SN - SN - SN - SN - SN - SN
22-08-2024 09:14:14am
SN - SN - SN - SN - SN - SN - SN - SN