

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VII (NEW) EXAMINATION – WINTER 2021****Subject Code:2170101****Date:23/11/2021****Subject Name: Aircraft Design-1****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define - Fuel on Board, Basic Empty Weight, Expandable payload	03
	(b) Define- Non-Expandable Payload. How does it affect flight performance?	04
	(c) What is Cruise Speed? Discuss relation between cruise speed and service ceiling.	07
Q.2	(a) Define range and endurance.	03
	(b) How does a takeoff weight affects range and endurance of the flight?	04
	(c) With block diagram shortly explain design methodology for any twin engine general aviation piston prop aircraft.	07
OR		
	(c) Discuss different phases of flight from engine start up upto engine cut-off.	07
Q.3	(a) How will you estimate Lift/Drag ratio.	03
	(b) How will you estimate wet area of any particular design?	04
	(c) How will you determine wing loading of aircraft? Which phases will you consider to find out wing plan form area? Explain shortly.	07
OR		
Q.3	(a) Discuss considerations for selection of T tail.	03
	(b) By example of a fighter jet explain how Thrust/Weight affects dog fight performance.	04
	(c) How will you determine Thrust requirement of a jet transport aircraft?	07
Q.4	(a) Discuss effects of wing loading on climbing performance of heavy transport aircraft.	03
	(b) Explain how loading on wing area affects performance of aircraft while descending without thrust or power?	04
	(c) How will you determine plan form area of tail plane?	07
OR		
Q.4	(a) Only draw the chart showing Mach number Vs. type of engine or power plant.	03
	(b) Shortly explain considerations to select airfoil of wing root and wing tip.	04
	(c) Discuss loads on structural components of Vertical Fin in case of Rudder deflection.	07
Q.5	(a) What do you understand by refined weight estimation method?	03
	(b) Shortly discuss any two engine location with neat sketch.	04
	(c) Discuss advantages and disadvantages of high wing and low wing configurations.	07

OR

- Q.5** (a) Only draw swash plat mechanism with nomenclature. **03**
(b) Differentiate between flapping and feathering. **04**
(c) Explain function of tail rotor in conventional VTOL equipment. **07**
