GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2021

Subject Code:2170101   **Date:03/08/2021**
Subject Name:Aircraft Design I
Time:10:30 AM TO 01:00 PM   **Total Marks: 70**
Instructions:
    1. **Attempt all questions.**
    2. **Make suitable assumptions wherever necessary.**
    3. **Figures to the right indicate full marks**

			MARKS
Q.1	(a)	Define Maximum Take off weight, Basic empty weight and fuel weight.	**03**
	(b)	Explain phases of flight of any general aviation aircraft.	**04**
	(c)	Shortly discuss conceptual, preliminary and detail design process.	**07**
Q.2	(a)	Shortly discuss structure factor.	**03**
	(b)	Explain how fuel quantity affects range and endurance of any aircraft.	**04**
	(c)	Explain method to estimate Max. Take off weight in brief.	**07**
		OR	
	(c)	How will you select cross section of wing for particular speed and altitude?	**07**
Q.3	(a)	How will you select chord and span of ailerons and rudder?	**03**
	(b)	Discuss effects of distances among 3 undercarriages of aircrafts.	**04**
	(c)	Discuss under carriage retraction geometry of a conventional jet transport aircraft.	**07**
		OR	
Q.3	(a)	Only draw side view of a landing gear of naval/marine fighters with necessary angles.	**03**
	(b)	Explain how to set size of elevator.	**04**
	(c)	Discuss the effects of C_t/C_r on cruise and turns.	**07**
Q.4	(a)	Which components of aircraft are considered in basic empty weight?	**03**
	(b)	Discuss effect of T_{max}/W_o ratio on activeness of aircraft? Which maneuvers will be affected by variation in wing loading?	**04**
	(c)	Discuss the effects of aspect ratio of wing on airframe strength and flight performance.	**07**
		OR	
Q.4	(a)	Shortly explain engine selection process.	**03**
	(b)	How will you chose plan form shapes of Vertical Stabilizer?	**04**
	(c)	Which considerations will you take to select tail plane configuration?	**07**
Q.5	(a)	Explain V Tail function of any conventional aircraft.	**03**

	(b)	Explain graph of Type of Engine VS M.$_{max}$	**04**
	(c)	Explain contra rotor configuration and flight control of helicopter.	**07**

OR

Q.5	(a)	Shortly explain function of both rotors in conventional helicopter.	**03**
	(b)	Discuss selection criteria of cross sections of main rotor blades.	**04**
	(c)	With neat sketch explain control system of swash plate of conventional helicopters.	**07**

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