Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2170101 **Date: 15/11/2018**

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)**	Draw a flight envelop of a deep penetration strike attack in detail.	**03**
	(b)	Only draw any type of wing plan form shape and clearly mention Mean Aerodynamic Chord, Geometric Aerodynamic Centre, Root Chord, Tip Chord, C.G Range and Neutral Point.	**04**
	(c)	Carry out a detailed comparison between turbofan engine and turboprop engine.	**07**
Q.2	**(a)**	What is the necessity of sweep back angle in wing and tail of airplane?	**03**
	(b)	Explain the following terms: Range, Endurance, Empty weight, Maximum take-off weight.	**04**
	(c)	Explain the significance of different wing plan form shapes using neat sketches.	**07**
		OR	
	(c)	Write down the advantages and disadvantages of different types of aft-tail configurations (draw required sketches).	**07**
Q.3	**(a)**	Explain the aerodynamic requirement of high lift device during take-off and landing of aircraft.	**03**
	(b)	How to design landing gear of civil airplane? Explain in brief using neat sketches.	**04**
	(c)	Clearly explain the three phases of aircraft design using block diagram.	**07**
		OR	
Q.3	**(a)**	Explain the significance of tail rotor in helicopter.	**03**
	(b)	Which aerodynamic considerations will you make to design a fuselage of civil aircraft?	**04**
	(c)	Explain the primary controls of helicopter in detail.	**07**
Q.4	**(a)**	List out different type of aircraft in detail.	**03**
	(b)	What is the requirement of trim tab on control surfaces of airplane? Explain in detail with neat sketch.	**04**
	(c)	Explain the following terms: I. Decision speed II. Minimum unstick speed III. Flare distance IV. Minimum control speed in the air	**07**
		OR	
Q.4	**(a)**	What is adverse yaw?	**03**
	(b)	Explain different types of helicopter configurations in detail using neat sketches.	**04**

	(c)	Explain landing performance of an aircraft with the help of neat sketches.	**07**
Q.5	**(a)**	What is the function of winglet?	**03**
	(b)	Make comments on stability and maneuverability of low wing dihedral and high wing anhedral configurations.	**04**
	(c)	Suppose you need to design a cargo plane, then what kind of wing configuration you are going to select and why? What will be the location and type of engine and why?	**07**

OR

Q.5	**(a)**	Write down the significance of wing twist and taper ratio.	**03**
	(b)	Explain control surface integration in fighter plane.	**04**
	(c)	Write down the advantages and disadvantages of low wing, mid wing and high wing configurations	**07**

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