Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-IV Remedial Examination Nov/ Dec. 2010

Subject code: 140104

Subject Name: Fundamentals of Aeronautics

Date: 08 / 12 / 2010 **Time: 03.00 pm – 05.30 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain principle of lift generation on wings.	**07**
	(b)	Explain four types of forces acting upon an aircraft, while flying.	**04**
	(c)	State different material properties required for aircraft materials.	**03**
Q.2	**(a)**	What are the basic structural elements requires for aircraft structures. Explain about axial member and shear panel.	**07**
	(b)	Compare torsional rigidity of the solid circular shaft and hollow circular shaft of same cross sectional area and comment on the result in context of aircraft structure.	**07**
		OR	
	(b)	Write functions of bulkhead, spar and frame.	**07**
Q.3	**(a)**	With propeller vector diagram explain how thrust generated by a propeller?	**08**
	(b)	Explain function of Flaps.	**03**
	(c)	Explain about induced drag.	**03**
		OR	
Q.3	**(a)**	Explain working principle of gas turbine jet engines	**08**
	(b)	Draw an aerofoil nomenclature.	**03**
	(c)	Explain about skin friction drag.	**03**
Q.4	**(a)**	Explain functions of secondary control surfaces.	**07**
	(b)	Why hollow section is proffered for aircraft structure?	**07**
		OR	
Q.4	**(a)**	Explain functions of primary control surfaces.	**07**
	(b)	Draw the sketch of an aircraft and labeled it with different control surfaces and major components.	**07**
Q.5	**(a)**	Prove that zero-lift drag is one-third of the drag due to lift at minimum power requirement.	**07**
	(b)	Draw the sketch of an aircraft and labeled it with different control surfaces and major components.	**07**
		OR	
Q.5	**(a)**	Show that at minimum thrust requirement, zero-lift drag is equal to the drag due to lift.	**07**
	(b)	Derive equation of motion of an aircraft for level flight.	**07**

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