

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– V (New) EXAMINATION – WINTER 2019****Subject Code: 2150103****Date: 04/12/2019****Subject Name: Aircraft Structures II****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) Clearly explain the loads acting on an aircraft for different flight conditions with neat sketches.	03
	(b) Discuss about the failures occur in structural components of aircraft for different flight conditions.	04
	(c) Briefly explain about the load bearing members of wing, fuselage and empennage section with neat sketches	07
Q.2	(a) Define Shear Centre and Shear Flow.	03
	(b) What do you understand by the term buckling of a structure? Give an example of an aircraft structural component prone to buckling.	04
	(c) How the structure of civil aircraft is different from fighter aircraft? Discuss using critical points.	07
OR		
	(c) A simply supported beam has a central point load of W. Determine the deflection curve and the maximum deflection if the beam is doubly symmetric.	07
Q.3	(a) Define Stiffness and state the characteristics of Stiffness Matrix.	03
	(b) Explain with neat sketch the state of stress at a point in three dimensions	04
	(c) Derive the equation of torque for a bar from Prandtl stress function	07
OR		
Q.3	(a) Enlist the different ways of making the section free from torsion.	03
	(b) Describe the difference between Symmetrical Bending and Unsymmetrical Bending?	04
	(c) What is the need of V-n diagram? Explain using neat sketch.	07
Q.4	(a) Define Principal Centroidal Axis.	03
	(b) What are the different cross sections that can be used in spar of a wing? Which one is most preferable and why?	04
	(c) Explain torsion of multi cell open section beams.	07
OR		
Q.4	(a) Define neutral axis.	03
	(b) Enlist the basic equations of equilibrium, compatibility and stress strain relations for plane stress condition in polar coordinate system.	04
	(c) Explain torsion of multi cell closed section beams.	07
Q.5	(a) Explain St Venant's principle.	03
	(b) Describe principle moment of inertia.	04
	(c) Derive the equations for direct bending stress distribution. Also sketch the direct bending stress distribution of an I-section.	07
OR		
Q.5	(a) What do you mean by in plane stress and out of plane stress?	03
	(b) Prove that 'Stiffness matrix and Flexibility matrix are inverse to one another'.	04
	(c) What is redundancy? Explain its significance with suitable example of aircraft structure.	07
