

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019****Subject Code: 2180101****Date: 27/11/2019****Subject Name: Aircraft Design II****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. Attempt Q-1 and Q-2 (a), (b) in drawing sheet only.
5. Use drawing instruments for sketches.

		MARKS
Q.1	(a) Only draw intermediate section of a circle to square adaptor having one end of 10 cm of diameter and other end of 10 X 10 cm.	03
	(b) Only a geometry of a side view of a jet fighter aircraft	04
	(c) A delta wing has a root chord of 24 feet and tip chord is 3 feet. And wing span of 24 feet. Draw a layout of a wing showing Mean Aerodynamic chord, Geometric Aerodynamic Centre, C.G range. Mention elevons and leading edge flaps on layout whose $C_{ht} = 0.14$. Taper ratio of elevon is 0.7. Note: Tail moment arm is 24% of chord up to trailing edge of delta wing.	07
Q.2	(a) Only draw layout of a horizontal stabilizer for cruise mach number 0.85 having span of 48 feet. Root chord= 10 feet. Taper ratio is 0.4. Aspect ratio is 4. Control surface size is 30 % of chord.	03
	(b) Draw side view of vertical fin for mach number of 0.85. Height of vertical fin is 24 feet. Taper ratio is 0.4, Aspect ratio is 4.	04
	(c) How will you manage to spread longerons along with fuselage longitudinal axis? Explain with reference to fuselage lofting techniques.	07
	OR	
	(c) How will you prepare shapes of formers such a way that you don't require to manufacture skin panel by dye forming process?	07
Q.3	(a) Explain requirements of supersonic area rule.	03
	(b) How will you reduce overall detectability of a subsonic large size bomber?	04
	(c) Discuss design considerations of supersonic jet fighters with respect to radar detectability, sustainability against battle damage and maneuverability.	07

OR

- Q.3 (a)** What is importance of over nose angle? **03**
(b) Only draw a cross section of a pressurized fuselage of a public transport aircraft having seating arrangement of 3X3. Mention ideal seat width, aisle width, and aisle height as well. **04**
(c) With neat sketch explain considerations how to locate expandable payloads on a layout of a supersonic jet fighter aircraft? **07**
- Q.4 (a)** With neat sketch explain gear retraction geometry of nose wheel of a jet transport aircraft. **03**
(b) Only draw a side view of a conventional sea plane hull. **04**
(c) With neat sketch explain selection of location of 3 similar types of aircraft engines. **07**
- OR**
- Q.4 (a)** How will you select tail moment arm for a conventional aircraft while preparing layout? **03**
(b) Explain only 2 types of jet VTOL configurations with neat sketch. **04**
(c) Discuss fuel system integration with neat layout of a jet transport aircraft. **07**
- Q.5 (a)** Discuss castoring wheel geometry with respect to positive stability of nose wheel damping of directional stability. **03**
(b) Discuss any two types of prop VTOL configurations with neat sketch. **04**
(c) How will you locate four turbo prop engines on wings with respect to span wise and longitudinal locations? Discuss about clearance between propeller and fuselage, clearance between two adjacent engines. **07**
- OR**
- Q.5 (a)** How will you select types of shock absorber of a landing gear? **03**
(b) Only draw any four types of helicopter main rotor configurations. **04**
(c) Discuss considerations to locate subsystems in a fix wing aircraft. **07**
