



**GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-VIII (NEW) - EXAMINATION – SUMMER 2018**

**Subject Code: 2180101**

**Date: 04/05/2018**

**Subject Name: Aircraft Design 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.
4. Attempt Q-1 in drawing sheet.

**MARKS**

**Q.1 (a)** Draw a layout/Top view of Horizontal stabilizer/ 03

Stabilator. Tail moment arm is 40 feet. Wing area is 1600 ft<sup>2</sup>. Taper ratio is 0.4. Aspect ratio is 5. Max mach number is 0.89. Tail Volume coefficient of Horizontal stabilizer/ Stabilator is 1.

(Note: Consider all dimensions for Horizontal stabilizer)

**(b)** Drawd a side view of vertical fin. Tail moment arm is 40 04  
feet. Wing area is 1600 ft<sup>2</sup>. Taper ratio is 0.3. Aspect  
ratio is 2. Max mach number is 0.89. Tail Volume  
coefficient of vertical fin is 0.09.

**(c)** Prepare a layout of starboard wing. Root chord is 16 feet. 07  
Tip chord is 4 feet. Wing span is 80 feet. Sweep back  
angle is 25°. Mention MAC, GAC, CG range, Neutral  
point.

**Q.2 (a)** With neat sketch explain how will you improve radar 03  
detectability.

**(b)** What are the effects of base distance and track distance 04  
on ground maneuvering of tricycle wheel configuration?

**(c)** How many maneuvering will you consider wing 07  
loading?

**OR**

**(c)** With neat sketch explain conic lofting technique for 07  
fuselage.

**Q.3 (a)** Describe aural signature. 03

**(b)** How will you reduce visual detectability of aircraft? 04

**(c)** Explain difference between vulnerability and 07  
sustainability of a multi role fighter jets.



**OR**

- Q.3** (a) Explain longitudinal contour lines for fuselage layout. **03**
- (b) Very shortly explain cyclic and collective pitch. **04**
- (c) Explain applications of circle to square adaptors in jet fighters. **07**
- Q.4** (a) How will you determine size of rudder? **03**
- (b) With neat sketch explain crew station design of a jet fighter aircraft. **04**
- (c) Discuss maintainability of aircraft. How will you improve maintainability? **07**

**OR**

- Q.4** (a) How will you determine size of elevator? **03**
- (b) With neat sketch explain passenger cabin design of a jet transport aircraft. **04**
- (c) Discuss techniques to protect passengers at the time of crash in public transport aircrafts. **07**
- Q.5** (a) On which basis will you choose wheel arrangements? **03**
- (b) How will you determine size of ailerons? **04**
- (c) Discuss structural considerations of a monocoque fuselage aircrafts. **07**

**OR**

- Q.5** (a) Shortly explain any one type of under carriage retraction geometry. **03**
- (b) Very shortly explain wing lofting technique. **04**
- (c) Discuss Aerodynamic considerations of empennage mounted engine aircraft. **07**

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