

**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/ 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. **03**

(Note: Consider all dimensions for Horizontal stabilizer)

- (b) Draw a side view of vertical fin. Tail moment arm is 40 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. **04**
- (c) Prepare a layout of starboard wing. Root chord is 16 feet. Tip chord is 4 feet. Wing span is 80 feet. Sweep back angle is 25°. Mention MAC, GAC, CG range, Neutral point. **07**
- Q.2** (a) With neat sketch explain how will you improve radar detectability. **03**
- (b) What are the effects of base distance and track distance on ground maneuvering of tricycle wheel configuration? **04**
- (c) How many maneuvering will you consider wing loading? **07**

**OR**

- (c) With neat sketch explain conic lofting technique for fuselage. **07**
- Q.3** (a) Describe aural signature. **03**
- (b) How will you reduce visual detectability of aircraft? **04**
- (c) Explain difference between vulnerability and sustainability of a multi role fighter jets. **07**

**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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