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**BTECH**  
**(SEM VIII) THEORY EXAMINATION 2017-18**  
**Aircraft Design & Testing**

*Time: 3 Hours*

*Total Marks: 100*

**Notes:**

- Assume missing data, wherever necessary.

**SECTION- A**

- 1. Attempt all Parts. All parts carry equal marks. (2x10 = 20)**
- a. Define the honeycomb and sandwich structure materials.
  - b. Define load factor & safety factor.
  - c. Write the parts aircraft engines.
  - d. Define types of fuselage.
  - e. Define the guest load on aircraft
  - f. Write the name of high lift devices.
  - g. Define absolute & service ceiling.
  - h. Define smoke tunnel.
  - i. Define yaw prove hole.
  - j. Write the formula of lift, drag & momentum coefficients.

**SECTION- B**

- 2. Attempt any five questions from this section. (10x5 = 50)**
- a. Explain inertial load, Aerodynamic loads on aircraft.
  - b. Explain the different type aircraft engines, explain working turbojet engine.
  - c. Explain different types of guest loads and guest enveloped with neat diagram.
  - d. What is wind tunnel and explain open and close wind tunnel.
  - e. Explain turning, banking and gliding of aircraft.
  - f. Explain various type of cockpit and passenger cabin layout of a aircraft with neat sketch.
  - g. Explain the aircraft design requirement and its specification roll of uses.
  - h. A jet powered executive aircraft having following characteristic for design.  
Normal gross weight 88176N, wing span = 16.25m, wing area = 29.54 m<sup>2</sup> fuel capacity = 111gal specific fuel consumption = 204 kg/N-hr, thrust = 32484N and C<sub>D</sub> = 0.02 e= 0.8  
Calculate (i) required power to thrust ratio (ii) over all weight ratio to wing loading.

**SECTION- C**

- Attempt any two questions from this section. (15x2 = 30)**
3. Explain different types of lading gear and calculation for location main and nose landing gears.
  4. Explain different method of pressure measurement in wind tunnel and explain any one.
  5. Estimate the take-off distance and landing distance of an aircraft assume a paved run way  $\mu_r = 0.02$ , during ground, the angle of attack of aircraft is restricted and max C<sub>L</sub> = 1.0, wing length= 1.83m weight = 19815N wing span area = 16.25 m<sup>2</sup> and  $\phi = 0.764$ . C<sub>D0</sub> = 0.8, density ( $\rho$ ) = 0.9 kg/m<sup>3</sup> and thrust = 28400N.