Printed pages: 2	EAE701
(Following paper code and roll No. to be filled in your answer book)	
Paper code: 148701	Roll No.

B TECH
(SEM VII) THEORY EXAMINATION 2014-15
AIRCRAFT STRUCTURES

TIME: 3 Hours **Total Marks: 100**

Note: Draw diagrams where ever necessary.

Q-1 Attempt any two of the following: 10x2=20

a. Discuss the different types of load which act on the following structural parts of airplane.
   i. Wings
   ii. Fuselage
b. Draw a typical velocity-load factor (V-n) diagram and discuss its necessity and uses?
c. Explain the importance of terms LIMIT- LOAD, ULTIMATE- LOAD, GUST-LOAD ,FACTOR OF SAFETY while dealing with aircraft structures.

Q-2 Attempt any two of the following: 10x2=20

a. What do you understand by sandwich structures and honeycomb structures? How are they useful for aircraft structures?
b. Write short notes on
   i. Beam columns and end moments.
   ii. Membrane analogy

c. A thin walled stiffened beam i.e. a beam with two stiffeners and a web is subjected to a transverse force passing through the centroid of the two stiffeners. Find the shear flow (q) and the shear stress (s) in the web. Given
   1. Distance between the stiffeners (h) =0.5 m
   2. Transverse Force per unit length of the beam (V) =4 N
   3. Thickness of the web (t) = 0.02m

Q-3 Attempt any two of the following: 10x2=20

a. Discuss buckling of rectangular sheets when its edges are subjected to uniform compression.
b. What do you understand by wire-wound-shells? Discuss the types of stresses developed in it. How they are useful in aircraft applications?
c. Explain how the strength of stiffened flat panels can be varied.

Q-4 Attempt any two of the following: 10x2=20

a. Briefly discuss St. Venant's Torsion theory
b. What do you understand by buckling? Discuss buckling of plates.
c. Explain Hooke's law for plane stress and plane strain for a 3 dimensional body

Q-5 Attempt any two of the following: 10x2=20

a. Describe wind tunnel balance.
b. Briefly explain the types and applications of strain-gauges.
c. Explain Brittle lacquer technique and its usefulness in aircraft applications.