Aircraft Structures-II

Important 13mark questions

Unit I

1. A thin walled section shown in Fig is subjected to M_x = 1500 N-m and M_y = 500 N-m where X and Y are centroidal axes of the section. Determine the bending stresses at the indicated points using k-method.
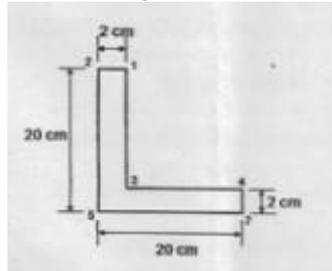
2. Explain the method of determining the free-end deflection of a cantilever beam subject to a tip concentrated moment M_0 in a plane inclined at Ø to the vertical plane. The beam is uniform with an unsymmetrical cross-section.

Unit II

1. Derive an expression for shear flow in an arbitrary open section and how to modify the results you obtained for the case of closed section.
2. Determine the shear center for the idealized section shown in fig. Assume the skin is ineffective in bending and the section is subjected to upward shear force of 2000 N.
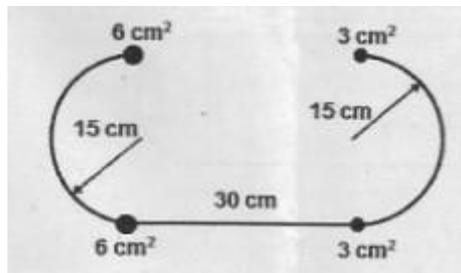

Unit III

1. Determine the shear flow pattern for the cell closed section shown in fig.
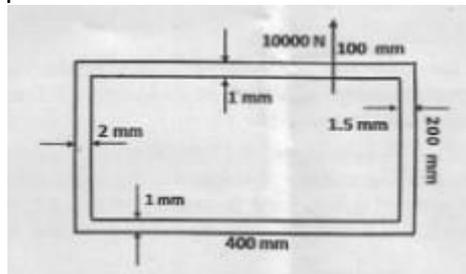
2. Determine the shear flow distribution in the cross-section shown in fig. where the radius of the semi-circular part is 15 cm while wall thickness = 1.5 mm. The section is subject to a downward shearing force of $160\ kN$ passing through the shear center. Make the initial cut exactly at the mid-point of the vertical wall AC and sketch the initial shear flow distribution first. Then determine q_0 and plot the final shear flow on a separate diagram

radius = 15 cm

thickness = 1.5 mm
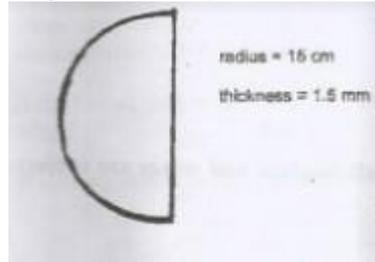
Unit IV

1. Describe the phenomenon of bucking of thin plates. Explain the significance of the plate buckling coefficient 'k'.
2. Write notes on the following topics:
   i)   Effective width of a thin stinffened sheet subject to compression
   ii) Strength of a thin-walled open section column

Unit V

1. Sketch and explain the features of a V-n diagram.
2. Describe the methods used for estimation of crippling stress thin walled composite section.