**Karunya University**

**(Karunya Institute of Technology and Sciences)**

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examinations – June 2016**

**Subject Title: AIRCRAFT STRUCTURES Time : 3 hours**

**Subject Code: 14AE2012 Maximum Marks: 100**

**Answer ALL questions (5 x 20 = 100 Marks)**

1. Using the Method of joints, Determine the member forces of the plane pin-jointed truss of figure 1.

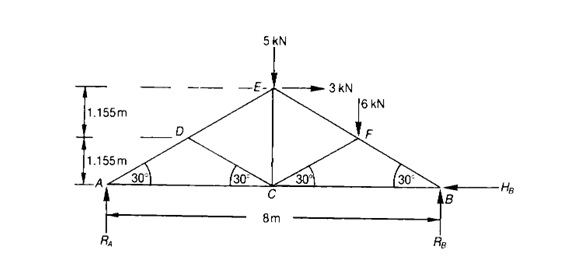


Figure 1

**(OR)**

2. A continuous beam ABC covers two consecutive span AB and BC of lengths 4 m and 6 m, carrying uniformly distributed loads of 6 kN/m and 10 kN/m respectively. If the ends A and C are simply supported, find the support moments at A, B and C. Draw also Bending Moment and Shear Force diagrams.

3. Calculate the vertical deflection of the Joint B and The horizontal movement of the support D in the truss shown in Figure 2. The cross-sectional area of each member is 1800mm2 and Young’s modulus, E, for materials of the members is 200 000 N/mm2 .



Figure 2

**(OR)**

4. Find all the Member-end moments of the beam shown in figure 3. EI is constant for all members. Sketch the bending moment by using method of moment distribution.



Figure 3

[P.T.O]

5. Determine the direct stress distribution in the thin-walled Z-section shown in Figure 4, Produced by a positive bending moment Mx.



Figure 4

**(OR)**

6. The fuselage of a light passenger carrying aircraft has the circular cross-section shown in figure 5. The cross-sectional area of each stringer is 100 mm2 and the vertical distances given in figure 5 are to the mid-line of the section wall at the corresponding stringer position. If the fuselage is subjected to a bending moment of 200kN-m applied in the vertical plane of symmetry, at this section, calculate the direct stress distribution

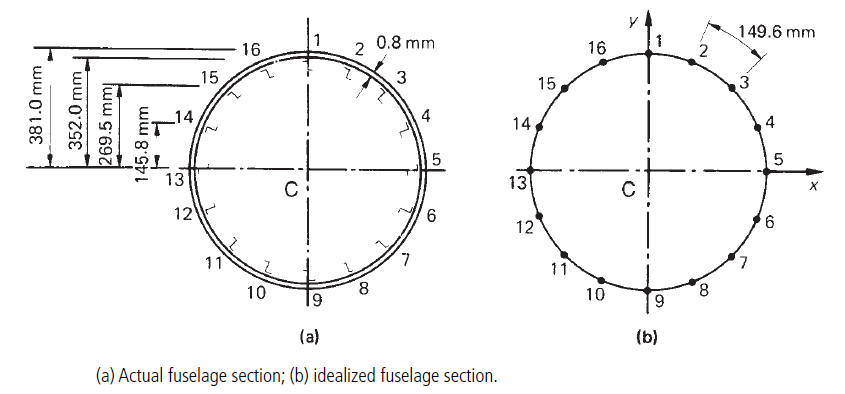


Figure 5

7. Determine the shear center of the C - section shown in figure.3. Shear force Sy, Shear center distance from web is e and take Sy / Ixx = 10 N/cm4.

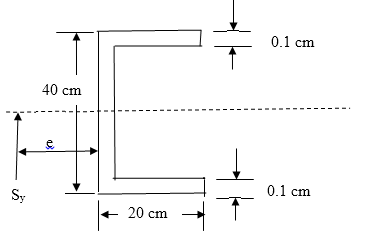


Figure 6

**(OR)**

8. Find the shear flow for the closed section shown in figure 6. Subjected to a vertical force V passing through the shear center. Thickness **t** for the entire wall.

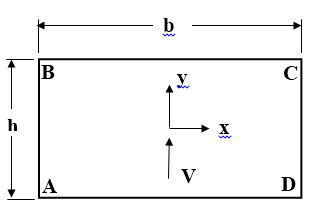


Figure 7

**Compulsory:**

9. A cantilever beam carries concentrated loads as shown in Figure.8. Calculate the distribution of stiffener loads and shear flow distribution in web panels assuming that the later are effective only in shear.

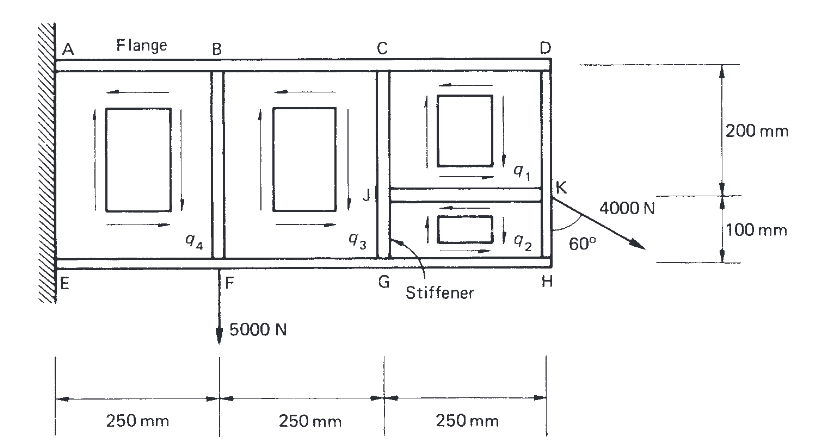


Figure 8