Reg.No. _____

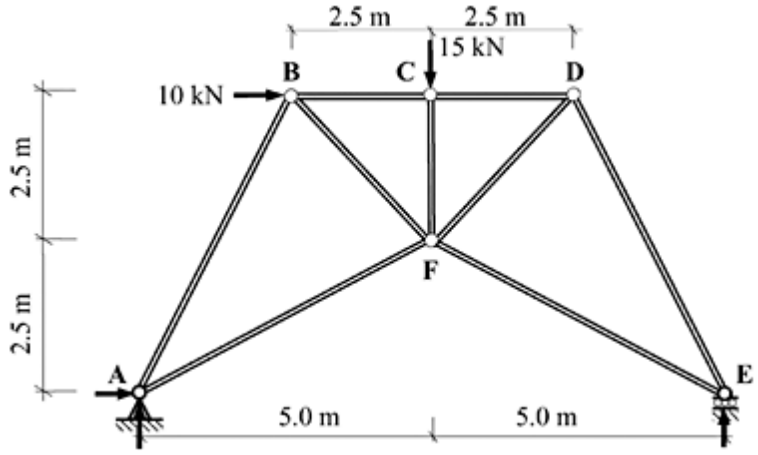
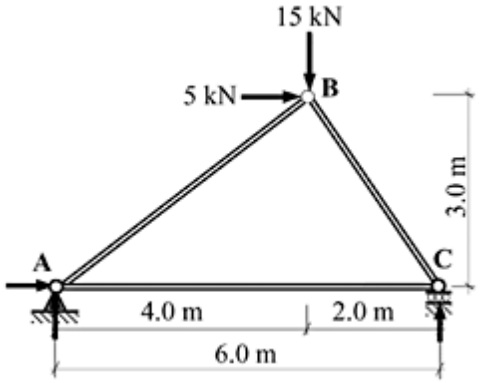
Karunya UNIVERSITY

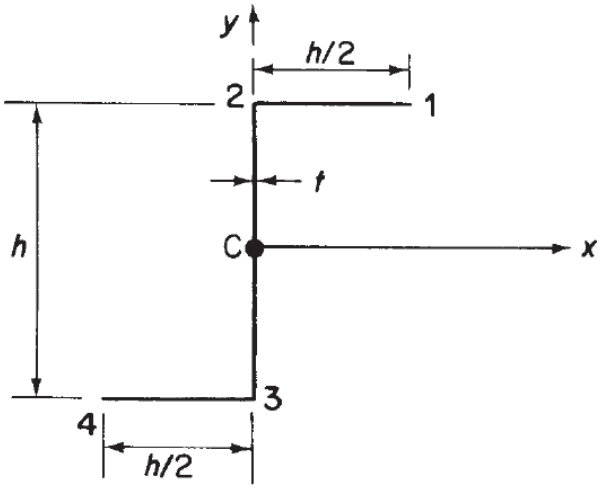
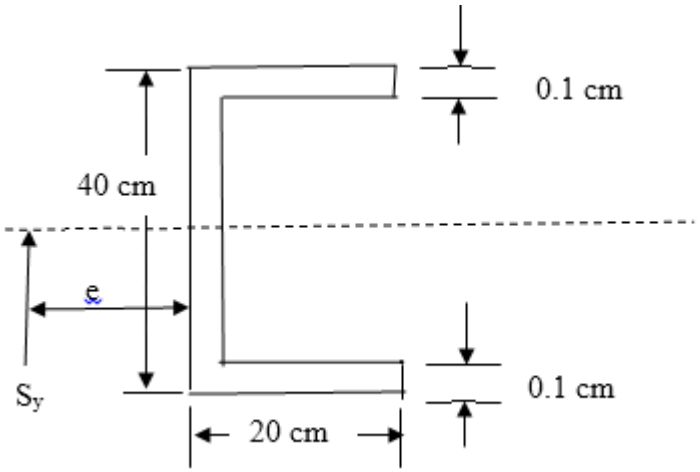
(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

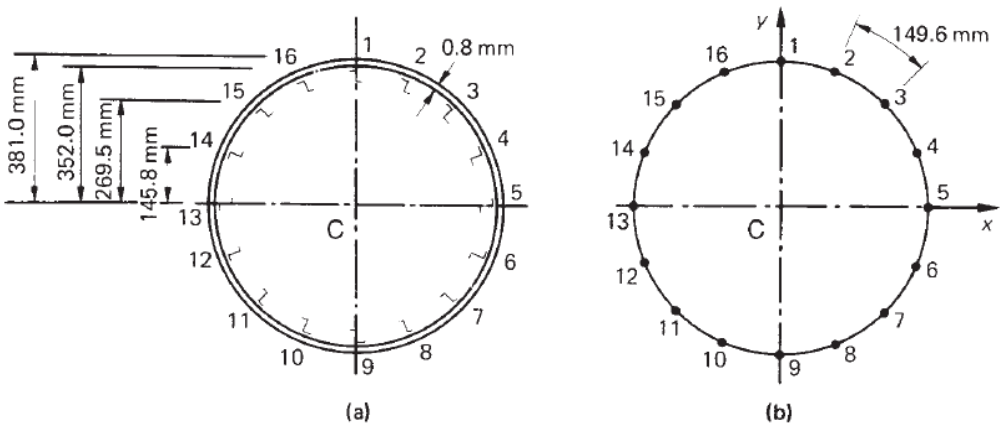
End Semester Examination – Nov/Dec – 2016

Code : 14AE2012 | **Semester : 2016-17 ODD**
Sub. Name : Aircraft Structures | **Duration : 3hrs** | **Max. marks : 100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Questions	Course Outcome	Marks
1.	Using the Method of joints, Determine the member forces of the plane pin-jointed truss of fig.1.  **Fig.1**	CO1	**20**
2.	Calculate the vertical deflection of the Joint B and The horizontal movement of the support C in the truss shown in Fig. 2. The cross-sectional area of each member is 1800mm^2 and Young's modulus, E, for materials of the members is 200 000 N/mm^2 .  Fig.2	CO1	**20**
3.	A continuous beam ABC consists of two consecutive spans AB and BC 4 meters each and carries a distributed load of 60 kN per meter run. The end A is fixed and the end C is simply supported. Find support moments, support reactions and draw the B.M. and S.F. Diagram.	CO1	**20**
4.	A continuous beam ABCD is fixed at A simply supported at B and C, the beam	CO1	**20**

	CD is overhanging. The spans AB=6m, BC=5m and overhanging DC=2.5m. The moment of inertia of the span BC is 2I and that of AB and CD is I. The beam is carrying a uniformly distributed load of 2kN/m over the span AB, a point load 5kN in BC at a distance of 3m from B and a point load of 8kN at free end. Evaluate the bending moment and shear force diagram.		
5.	Determine the direct stress distribution in the thin-walled Z-section shown in Fig.3, Produced by a positive bending moment M_x.  Fig.3	CO1	**20**
6.	Determine the shear center of the C - section shown in fig.4. Shear force S_y, Shear center distance from web is e and take $S_y / I_{xx} = 10$ N/cm^4.  Fig.4	CO2	**20**
7.	The fuselage of a light passenger carrying aircraft has the circular cross-section shown in fig.5. The cross-sectional area of each stringer is 100 mm^2 and the vertical distances given in fig.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.	CO2	**20**



(a) Actual fuselage section; (b) idealized fuselage section.

Fig.5

8.	A cantilever beam carries concentrated loads as shown in Fig.6. Calculate the distribution of stiffener loads and shear flow distribution in web panels assuming that the later are effective only in shear.	CO2	**20**

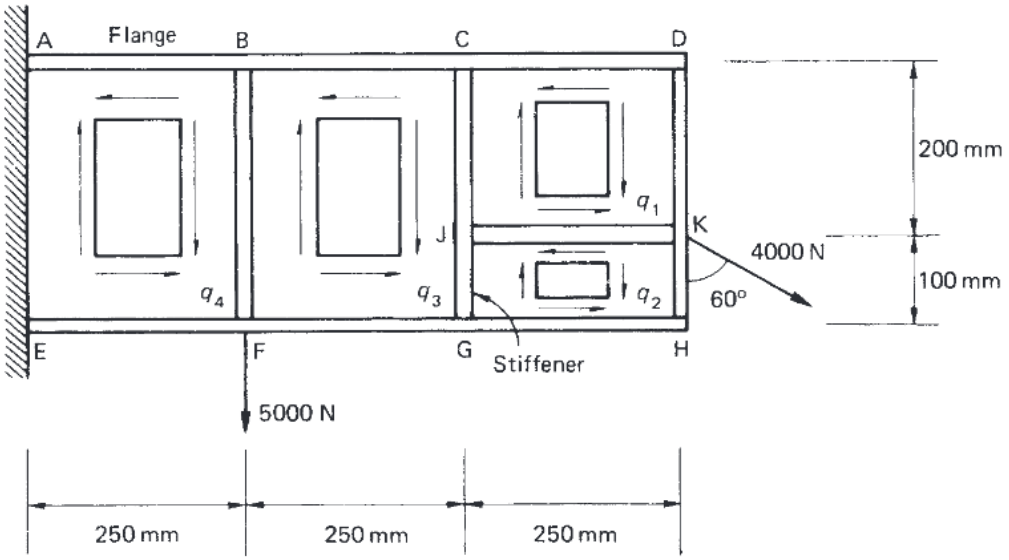


Fig.6

Compulsory:

9.	Derive the expression for buckling stress for thin plate under compression.	CO2	**20**

ALL THE BEST