Sanjay Ghodawat University, Kolhapur

2020-21

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EXM/P/09/00

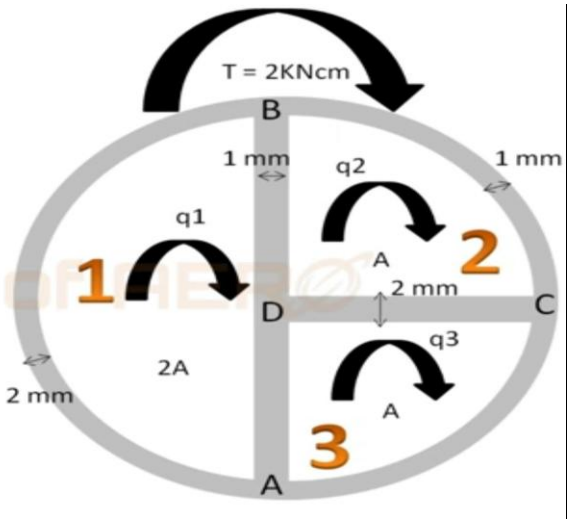
Year and Program: TY-B.Tech	**School of Technology**	**Department: AERO**
Course Code: AET303	**Course Title: Aircraft Structures-I**	**Semester : 05**
Day : Wednesday **Date: 16.12.2020**	**End Semester Examination**	**Time:2 Hrs.** **Max Marks:50**

Instructions: 1) All Questions are compulsory.
2) Assume data wherever necessary

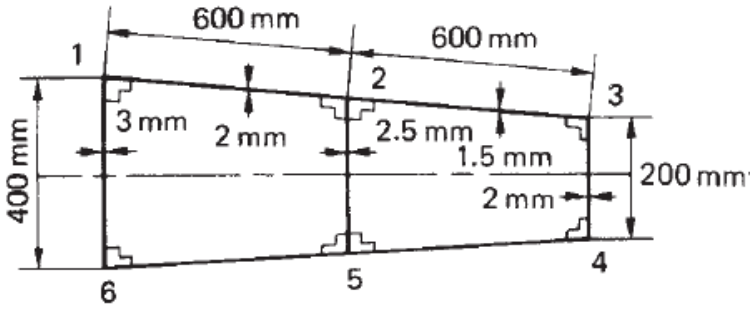
		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)**–			
a)	Imagine you are working as a structural analyst, consider a beam on your own and explain how do you calculate bending stress of a beam? What is the maximum bending stress in a beam?	8	4	CO1
b)	A beam of length 11m is simply supported at its ends and carries two point loads of 90kN and 60kN at a distance of 3m and 6m respectively from the left support. Calculate the deflection under each load. Find also the maximum deflection. Take $I=18X10^8 mm^4$ and $E=2X10^5 N/mm^2$.	8	3	CO2
c)	A beam of span 8m and of uniform flexural rigidity $EI = 40MN\text{-}m^2$, is simply supported at its ends. It carries a UDL of 20kN/m over the entire span. It is also subjected to a clockwise moment of 150kNm at a distance of 3m from the left support. Calculate the slope of the beam at the point of application of the moment.	8	4	CO2
Q.2	**Answer the following (any two) –**			
a)	Determine the diameter of a solid shaft which will transmit 310kW at 260rpm. The maximum shear stress should not exceed 32 N/mm^2 and twist should not be more than 1° in a shaft length of 3m. Take modulus of rigidity = $2X10^5 N/mm^2$.	8	3	CO3
b)	The stiffness of a close coiled helical spring is 1.5N/mm of compression under a maximum load of 70 N. The maximum shearing stress produced in the wire of the spring is 135 N/mm^2. The solid length of the spring is given as 7cm. Find : (i)Diameter of the wire, (ii)Mean diameter of the coils and (iii)The no. of coils required. Take $C=4.7X10^4 N/mm^2$.	8	3	CO3
c)	Explain the following terms. 1) Shear flow 2) CSRD 3) Shear center 4) Shear Force	8	2	CO4

Q.3 Answer the following (any two) –

a)	Find the shear flow and twist per unit length as shown in figure. Take $G=25x10^5$ N/cm^2 and radius=10cm.	9	3	CO4



b)	Part of a wing section is in the form of the two-cell box shown in figure 2 in which the vertical spars are connected to the wing skin through angle sections all having a cross-sectional area of 300 mm^2. Idealize the section into an arrangement of direct stress carrying booms and shear stress only carrying panels suitable for resisting bending moments in a vertical plane. Position the booms at the spar/skin junctions.Length of flange 25 is 300 mm.	9	3	CO5



c)	With the help of a neat sketch explain the most important aircraft massterms(Aircraft mass breakdown) with its significance.	9	2	CO5

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