Register Number:……..

KUMARAGURU
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B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Fifth Semester

AERONAUTICAL ENGINEERING

U18AEI5202**:** Aircraft Structures – II

COURSE OUTCOMES

CO1:	Analyze the response of structures due to unsymmetrical bending.
CO2:	Analyze bending, shear and torsion of open and closed thin-walled sections.
CO3:	Analyze the failure modes occur in thin-walled plates structures.
CO4:	Analyze behavior of aircraft structural components under various types of loads.

Time: Three Hours **Maximum Marks: 100**

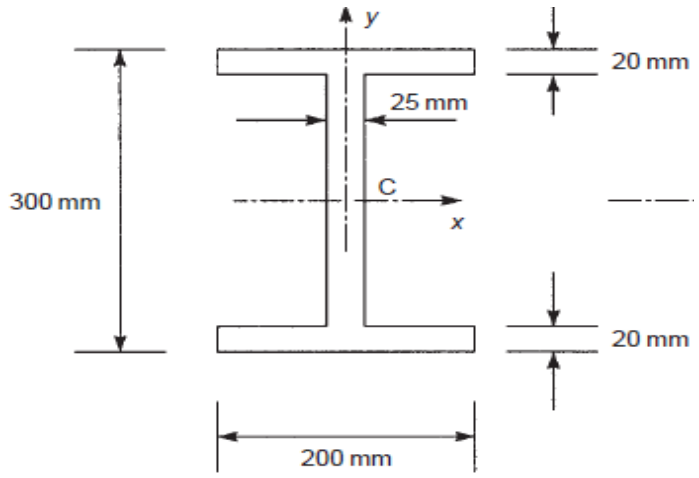
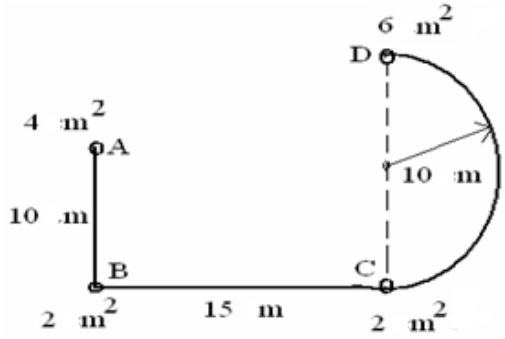
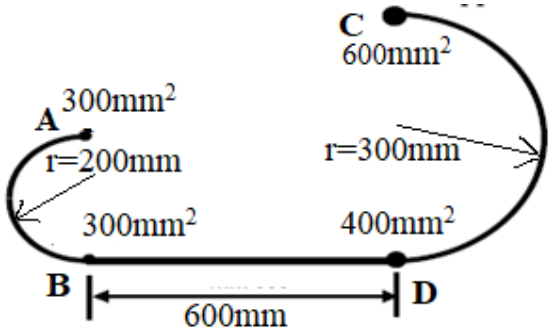
Answer all the Questions:-

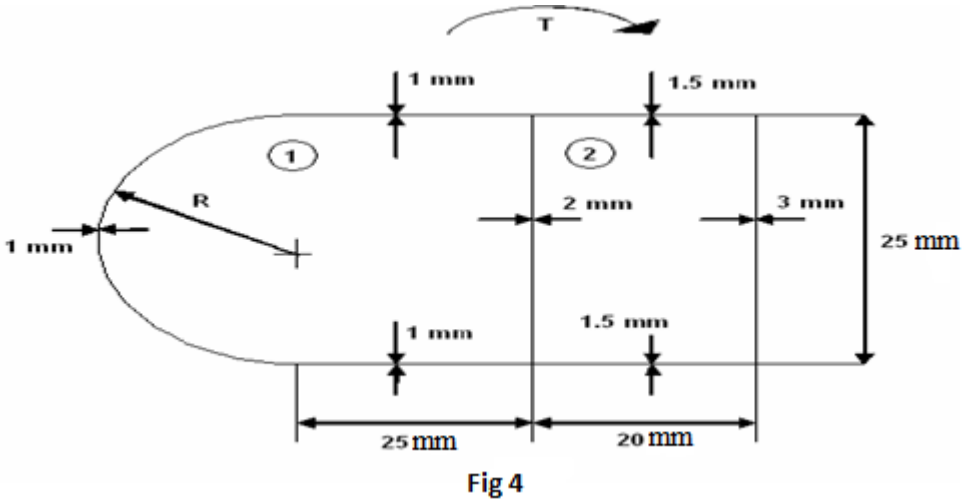
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Define Principal stress and principal plane.	CO1	[K_1]
2.	Explain how skew load will cause unsymmetrical bending in a beam of rectangular cross section.	CO1	[K_2]
3.	Define shear centre and elastic axis.	CO1	[K_1]
4.	Locate the shear centre for angle section, cruciform section and T-section.	CO2	[K_2]
5.	Define neutral axis. Write down the formula for finding the neutral axis.	CO2	[K_1]
6.	Differentiate between thin walled open and closed section.	CO2	[K_2]
7.	Define Crippling stress.	CO3	[K_1]
8.	Write down the governing differential equation of thin plate supporting transverse loading and in- plane compression.	CO3	[K_2]
9.	Draw the V-n diagram.	CO4	[K_1]
10.	Define Sheet wrinkling failure.	CO4	[K_1]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.		The cross-section of a beam has the dimensions shown in Fig. 1. If the beam is subjected to a negative bending moment of 100 kN m applied in a vertical plane, determine the distribution of direct stress through the depth of the section. Also	16	CO1	[K_4]

		determine the distribution of direct stress through the depth of the section if the bending moment is applied on a horizontal plane.  Fig.1			
12.		Find the Shear Center for the section shown in Fig. 2. The section is subjected to shear load of Sy = 1000N applied at the shear centre of the section.  Fig.2	16	CO1	[K4]
13.		Determine the shear flow pattern for the section shown in Fig .3. The radius of left semicircle is 200 mm and that of the right semicircle is 300 mm. The section is subjected to shear load of Sy = 10 kN applied at the shear centre of the section.  fig.3	16	CO2	[K4]

14.		Determine the shear flow and the angle of twist per unit length of the two cell tube as shown in the Fig. 4. The section is subjected to a torque 1000 Nmm. Take G = 40 GPa  Fig 4	16	CO2	[K_4]
15.		Explain Needham's and Gerard's method for calculating crippling stress in a plate	16	CO3	[K_2]
16.		What are the structural parts of an aircraft wing? List their functions.	16	CO4	[K_2]

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