Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**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– 2017**

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| **Code :** | **16AE2003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **AIRCRAFT STRUCTURES-II** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Questions** | **Course**  **Outcome** | | | **Marks** |
| 1. | Obtain the shear flow and shear center location for the cannel section (C-Section) subjected to a vertical shear load of 750N acting on shear center. The height of the vertical web is 30mm and width of the flanges is 20mm. Thickness of flanges and web is 1mm. | CO1 | | | 20 |
| (OR) | | | | | |
| 2. | Plot the shear flow and find the location the shear center for the section shown in fig.1.    Fig.1 | CO1 | | | 20 |
| 3. | Find the shear flow, shear center and twist of a multi-cell section shown in fig.2. Boom area A=B= 2 cm2 ,D = C = 6 cm2 , E = F = 4 cm2 .    Fig.2 | CO1 | | | 20 |
| (OR) | | | | | |
| 4. | The fuselage of a light passenger carrying aircraft has the circular bulk head cross-section shown in fig.3. The cross-sectional area of each stringer is 100 mm2 and the vertical distances given in fig.3. are to the mid-line of the section wall at the corresponding stringer position. If the fuselage is subjected to a vertical shear load of 20kN applied on the shear center, calculate the shear flow around the bulk head.     1. Actual aircraft fuselage bulk head 2. Idealize aircraft fuselage bulk head   Fig.3 | CO1 | | | 20 |
| 5. | A two cell tube shown in fig.4 subjected to torque T=100 kN. Calculate the shear flow and angle of twist.    Fig.4 | CO1 | | | 20 |
| (OR) | | | | | |
| 6. | a. Explain the Needham method of estimating crippling stress. | CO2 | | | 8 |
|  | b. Derive the governing equation for thin plate subjected to a distributed transverse load. | CO2 | | | 12 |
|  |  |  | | |  |
| 7. | Check whether the box beam shown in fig.5. will withstand the load without buckling and find the margin of safety. Given P1 = P2 =5000N. Area of the each stringer = 2 cm2 and the uniform skin thickness is 1.5mm throughout. Assume the sheets are effective in bending and made of 2024-T3 Aluminum alloy. For a/b= 2, kc = 5, ks= 6.5.    Fig.5 | CO3 | | | 20 |
| (OR) | | | | | |
| 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.    Fig.6 | CO3 | | | 20 |
|  | | |  |  | |
| **Compulsory**: | | |  |  | |
| 9. | a. Explain the structural idealization of wing and fuselage. | CO3 | | | 12 |
|  | b. What is rib and how does it transfer loads? | CO3 | | | 8 |

ALL THE BEST