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



**End Semester Examination – Nov / Dec – 2019**

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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.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Obtain the shear flow and shear center location for the channel section subjected to a vertical shear load of 750N. 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. |  | Compute the load and direct bending stress on the lumped flanges shown in figure below. Moment Mx = 1200 kN-cm, My = 80 kN-cm, Area of the flange A1 = 6 cm2, A2 =18cm2, A3 = 6 cm2, A4 = 18 cm2. | CO1 | 20 |
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| 3. |  | A beam having the cross-section shown in figure below is subjected to a bending moment of 1500 Nm in a vertical plane (Mx = 1500 Nm). Calculate the maximum direct stress due to bending stating the point at which it acts. | CO1 | 20 |
| **(OR)** | | | | |
| 4. |  | The thin-walled single cell beam shown in figure below has been idealized into a combination of direct stress carrying booms and shear stress only carrying walls. If the section supports a vertical shear load of 10 kN acting in a vertical plane through booms 3 and 6, calculate the distribution of shear ﬂow around the section. Boom areas: *B*1=*B*8=200 mm2, *B*2=*B*7=250 mm2, *B*3=*B*6=400 mm2*, B*4 = *B*5 =100 mm2. | CO1 | 20 |
| 5. |  | Derive the Euler’s crippling load for a column when it has both ends hinged and one end fixed and other end free. | CO2 | 20 |
| **(OR)** | | | | |
| 6. |  | A two cell tube shown in figure below subjected to torque T=100 kN. Calculate the shear flow and angle of twist. | CO2 | 20 |
| 7. |  | Calculate the shear flows in the web panels and direct load in the flanges and stiffeners of the beam shown in figure below.Assume the web panels resist shear stresses only. | CO1 | 20 |
| **(OR)** | | | | |
| 8. | a. | Write in detail about the loads acting on an aircraft fuselage. | CO3 | 10 |
| b. | Construct and discuss the V-n diagram. | CO3 | 10 |
|  | |  |  |  |
|  | | **Compulsory:** |  |  |
| 9. |  | Explain the semi-tension field beam and derive the important expressions involved in it. | CO3 | 20 |