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



**End Semester Examination – Nov/Dec– 2017**

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| **Code :** | **14AE2012** | **Duration :** | **3hrs** |
| **Sub. Name :** | **AIRCRAFT STRUCTURES** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | | Determine the support reactions and the forces in the members of the truss fig.1 using the method of joint.    Fig.1 | CO1 | 10 |
| b. | | Determine the support reactions and the forces in the members of the truss fig.2 using the method of joint.    Fig.2 | CO1 | 10 |
| (OR) | | | | | |
| 2. | A continuous beam ABCD is simply supported over three spans, such that AB= 8m, BC=12m and CD = 5m. It carries uniformly distributed load of 4 kN/m in span AB, 3 kN/m in span BC and 6 kN/m in span CD. Draw the shear force and Bending moment diagram using Clapeyron's three Moment Equation. | | | CO1 | 20 |
| 3. | A continuous beam ABCD is fixed at A and simply supported at B and C, the beam CD is overhanging. The spans AB=6m, BC=5m and overhanging CD=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 2 kN/m over the span AB, a point load of 5kN in BC at a distance of 3m from B, and a point load of 8kN at the free end. Determine the fixing moments at A, B and C and draw the bending moment diagram using moment distribution method | | | CO1 | 20 |
| (OR) | | | | | |
| 4. | Using the principle of virtual work, determine the vertical and horizontal deflection components of joints F of the truss in Fig.3. The cross section area of each member is 300 mm2 and E = 200 GPa.    Fig.3 | | | CO1 | 20 |
| 5. | A beam having the cross-section shown in Fig.4 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.    Fig.4 | | | CO1 | 20 |
| (OR) | | | | | |
| 6. | The thin-walled single cell beam shown in Fig.5 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.    Fig.5 | | | CO1 | 20 |
| 7. | A two cell tube shown in fig.6 subjected to torque T=100 kN. Calculate the shear flow and angle of twist.    Fig.6 | | | CO1 | 20 |
| (OR) | | | | | |
| 8. | Calculate the shear flows in the web panels and direct load in the flanges and stiffeners of the beam shown in fig.7.if the web panels resist shear stresses only.    Fig.7 | | | CO1 | 20 |
|  | | **Compulsory**: | |  |  |
| 9. |  | Drive the Governing differential equation of thin plate subjected to compressive loads. | | CO2 | 20 |

ALL THE BEST