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

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **16AE2002** | **Duration :** | **3hrs** |
| **Sub. Name :** | **AIRCRAFT STRUCTURES-I** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Find the forces in the members of truss shown in Fig. 1 by using method of joints.    Fig.1 | CO2 | 20 |
| (OR) | | | | |
| 2. |  | Using the principle of virtual work, determine the vertical and horizontal deflection components of joint C of the truss in Fig. 2. Young’s modulus E = 200 x 106 kN/m2 and sectional area of each member A = 100 x 10-6 m2.    Fig.2 | CO2 | 20 |
|  |  |  |  |  |
| 3. |  | A continuous beam ABCD of length 15 m rests on four supports covering 3 equal spans and carries a uniformly distributed load of 1.5 kN/m length shown in figure 3. Calculate the moments and reactions at the supports. Draw the shear force and bending moments diagram using three moment method.    Fig.3 | CO2 | 20 |
| (OR) | | | | |
| 4. |  | A continuous beam ABCD of length 15 m rests on four supports shown in Fig. 4. Draw the shear force and bending moments diagram using moment distribution method.    Fig.4 | CO2 | 20 |
|  |  |  |  |  |
| 5. |  | Drive the Euler’s equation for the Column with both ends are hinged or pinned and fixed. | CO2 | 20 |
| (OR) | | | | |
| 6. |  | Calculate the safe compressive load on a hollow cast iron column (one end fixed and other hinged) of 150 mm external diameter, 100 mm internal diameter and 10 m length. Use Euler’s formula with a factor of safety of 5 and E= 95 GN/m2. | CO2 | 20 |
|  |  |  |  |  |
| 7. |  | Derive an expression for bending stress in an unsymmetric section subjected to Mx and My with respect to neutral axis. | CO1 | 20 |
| (OR) | | | | |
| 8. |  | The cross-section of a beam has the dimensions shown in Fig. 5. If the beam is subjected to a negative bending moment of 100 kN m applied in a vertical plane (i.e. MX = -100 kN), Calculate the maximum direct stress in the stating clearly the point at which it acts.    Fig.5 | CO1 | 20 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Briefly explain the different types of mechanical vibration with example. | CO3 | 10 |
| b. | Briefly explain the different types of material used in aircraft construction. | CO3 | 10 |