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

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

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| **Code :** | **16AE2001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **STRUCTURAL MECHANICS** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Briefly explain the stresses and strain due to different types of loads and illustrate the stress –strain for ductile and brittle material. | CO1 | 20 |
| (OR) | | | | |
| 2. | a. | Describe principal planes and principal stresses. | CO1 | 5 |
| b. | Explain the Mohr’s circle construction for two perpendicular direct stresses with state of simple shear. | CO1 | 15 |
|  |  |  |  |  |
| 3. |  | A brass bar, Having cross-sectional area of 1000 mm2, is subjected to axial forces as shown in Fig.1. Find the total elongation of the bar. Take E=1.05 x 105 N/mm2.    Fig.1 | CO1 | 20 |
| (OR) | | | | |
| 4. |  | A steel rod of 20 mm diameter passes centrally through a copper tube of 50mm external diameter and 40mm internal diameter. The tube is closed at each end by rigid plates of negligible thickness. The nuts are tightened lightly home on the projecting parts of the rod. If the temperature of the assembly is raised by 50 oC, Calculate the stresses developed in copper and steel. Take E for steel and copper as 200 GN/m2 and 100 GN/m2 and thermal expansion coefficient for steel and copper as 12 x 10-6 per oC and 18 x 10-6 per oC. | CO1 | 20 |
|  |  |  |  |  |
| 5. |  | Draw the shear force and bending moment diagram of the beam shown in fig.2.    Fig.2 | CO2 | 20 |
| (OR) | | | | |
| 6. |  | Draw the shear force and bending moment diagram of the cantilever beam shown in fig.3.    Fig.3 | CO2 | 20 |
|  |  |  |  |  |
| 7. |  | Determine the slope and deflection at point A,B,C and D on Beam as shown in Fig.4. Take I = 85 x 105 mm4 ; E = 2 x 105 N/mm 2.    Fig.4 | CO3 | 20 |
| (OR) | | | | |
| 8. |  | Determine the slope and deflection at point B and C on cantilever beam as shown in Fig.5. Take I = 108mm4 ; E = 2 x 105 N/mm 2.    Fig.5 | CO3 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Classify the spring with application. | CO4 | 5 |
| b. | Find the deflection and stiffness of the close-coiled helical spring with axial load. | CO4 | 15 |