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

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

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| **Code :** | **14CE2006** | **Duration :** | **3hrs** |
| **Sub. Name :** | **STRENGTH OF MATERIALS** | **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 beam of length 6 m is simply supported at its ends and carries two point loads of 48 kN and 40 kN at a distance of 1 m and 3 m respectively from the left support. Find:   1. Deflection under each load. 2. Maximum deflection. 3. The point at which maximum deflection occurs.   Given E = 2 x 105 N/mm2 and I = 85 x 106 mm4. Use Macaulay’s method. | CO2 | 20 |
| (OR) | | | | |
| 2. |  | A cantilever 2 m long carries a concentrated load of 15 kN at 1m from the fixed end and a load of 10 kN at the free end. Determine the deflection at the free end. Use conjugate beam method.  Assume E= 2x105 N/mm2, I=15x106 mm4. | CO2 | 20 |
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| 3. | a. | A continuous beam ABC of uniform section, with span AB and BC as 4m each, is fixed at A and simplysupported at B and C. the beam AB is carrying a uniformly distributed load of 5 kN/m. Span BC carries a point load of 4 kN at a distance 3m from point B. Find the support moments and reactions. Draw the shear force andbending moment diagrams. | CO1 | 16 |
|  | b. | Differentiate between determinate and indeterminate structures. | CO1 | 4 |
| (OR) | | | | |
| 4. |  | A pipe of 200mm internal diameter and 50mm thickness carries fluid at a pressure of 10MPa. Determine the maximum and minimum circumference stresses across the section.Also sketch the radial stress (pressure) distribution and circumferential stress distribution across the section. | CO1 | 20 |
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| 5. |  | A channel has flanges 120 mm x 20mm and web 160 mm x10 mm. Determine the shear centre of the channel. | CO2 | 20 |
| (OR) | | | | |
| 6. |  | Derive an expression for shear centre of channel section and hence determine the shear center O of a channel section of uniform thickness, b=100mm, h=150mm, t=3mm. | CO2 | 20 |
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| 7. |  | A hollow cast iron column is 4.5 m long and fixed at both ends. The internal diameter and external diameter of the column are 160 mm and 200 mm respectively. Determine the safe load by Rankine’s formula using a factor of safety of 4. бc = 550 MN/mm2 ; α=1/1600. | CO2 | 20 |
| (OR) | | | | |
| 8. |  | State the assumptions in Euler`s Theory. A steel rod 5m long and of 40mm diameter is used as a column with one end fixed and other end free. Assume E=200Gpa. Determine the crippling load by Euler’s formula. Also determine the crippling loads if   1. both ends are hinged. 2. both ends are fixed. 3. One end fixed and other end hinged. | CO2 | 20 |
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|  | | **Compulsory**: |  |  |
| 9. |  | Explain the various theories of failure. | CO3 | 20 |