Code No: R5210103 **R5**

II B.Tech I Semester(R05) Supplementary Examinations, May/June 2010
STRENGTH OF MATERIALS
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain the Following: -
   (a) Elasticity and Plasticity
   (b) Ductility and Malleability
   (c) Stress and Strain
   (d) Limit of proportionality and Elastic Limit [4+4+4+4]

2. A weight of 210 kN is supported by three short pillars each of sectional area 500 mm^2. The central pillar is of steel and the outer ones are of copper. The pillars are so adjusted that at a temperature of 15^0 C each carries equal load. The temperature is then raised to 950C. Find the stress in each pillar at 15^0C and 95^0 C. Take $E_s = 200$ GPa and $E_C = 80$ GPa $\alpha_s = 12 \times 10^{-6}$ / ^{0}C and $\alpha_c = 18 \times 10^{-6}$/ ^{0}C. [16]

3. (a) What are the different types of beams possible - describe the behavior of each of them.
   (b) Draw the S. F. and B.M. diagrams for a cantilever with a point load at the free end and u.d.l & throughout. [6+10]

4. (a) State the assumptions made in the theory of simple bending.
   (b) Derive the simple bending equation. [6+10]

5. Obtain the shear stress distribution for a rectangular cross section 230 × 400 mm subjected to a shear force of 40 KN. Calculate maximum and average shear stress. [16]

6. A simply supported beam carries a central concentrated load P. The end quarters have flexural rigidity EI and the central half has flexural rigidity 2 EI. Determine the maximum deflection and maximum slope in the beam. [16]

7. Define the terms
   (a) Circumferential stress
   (b) Longitudinal stress and derive the expressions for the same in thin cylinders. [16]

8. A thick cylinder having internal radius 200mm and external radius 300mm is subjected to $4N/mm^2$. Find the internal pressure that can be applied if the max. permissible stress is $15N/mm^2$. Find also the change in thickness of the cylinder. Take $E = 200GN/m^2$ and $\frac{1}{m} = 0.3$ [16]

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