

**II B.Tech I Semester Supplementary Examinations, November 2005**  
**STRENGTH OF MATERIALS-I**  
**(Civil Engineering)**

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

**Answer any FIVE Questions**  
**All Questions carry equal marks**

\*\*\*\*\*

1. Sketch the stress - strain diagram for a brittle material marking the salient points on it. How is this curve different from that of a ductile material. Explain the procedure of obtaining the yield stress of materials not having a well defined yield point. [16]
2. A steel rail 10 m long is in the unstressed condition at  $10^0$  C. If the temperature of the rail is increased to  $60^0$  C, find the stress induced if there is no provision for the expansion of the rail. If there is a gap of 5 mm what will be the change in stress, given  $E = 200 \text{ GN/m}^2$  &  $\alpha = 12 \times 10^{-6} / ^0\text{C}$ . [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. Derive an expression for the distribution of shear stress across the cross section. How is average shear stress defined. Relate maximum shear stress to the average shear stress in a rectangular section. [16]
5. Explain the analysis of trusses by
  - (a) Method of joints
  - (b) Method of sections
  - (c) Tension coefficient method. [16]
6. A cantilever of 4m span length carries a load 40 KN at its free end. If the deflection at the free end is not to exceed 8mm, what must be the moment of inertia of the Cantilever section? [16]
7. (a) Describe the modes of failures of riveted joints with sketches?  
(b) A double cover butt joint is used to connect plates of 12mm thick. Using Unwin's formula determine the diameter of the rivet, rivet value, pitch and efficiency of the joint. [16]
8. A shell 3.25m. long, 1m in diameter is subjected to an internal pressure of  $1\text{N/mm}^2$ . If the thickness of the shell is 10mm, find the circumferential and longitudinal stresses. Also find out the maximum shear stress and the changes in the dimensions of the shell. Take  $E = 2 \times 10^5 \text{ N/mm}^2$ ,  $\mu = 0.3$ . [16]

\*\*\*\*\*