

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

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Explain the following : -

- (a) Working stress
- (b) Factor of safety
- (c) Volumetric strain
- (d) Poisson's ratio.

[4+4+4+4]

2. Rails of 15 m length were laid on the track when the temperature was 20°C . A gap of 1.8 mm was kept between two consecutive rails. At what max temperature the rails will remain stress free ? If the temperature is raised further by 15°C , what will be the magnitude and nature of stresses induced in the rails? [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. Design the cross section for a beam acted upon by a bending moment = 50 KNm. If width of beam is 200 mm calculate, depth. $f = 9 \text{ N/mm}^2$. [16]

5. Explain the analysis of trusses by

- (a) Method of joints
- (b) Method of sections
- (c) Tension coefficient method.

[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. (a) Explain the different types of riveted Joints.

(b) Design a riveted Joint to connect an angle section tension member $80\text{mm} \times 80\text{mm} \times 8\text{mm}$ to a gusset plate 12mm thick. The member is to carry a load of 100 kN. [8+8]

8. (a) Define the terms

- i. Hoop strain
- ii. Longitudinal strain

(b) A cylindrical air receiver for a compressor is 2 m in internal diameter and made of plates 15mm thick. If the hoop stress is not to exceed 90 N/mm^2 and the longitudinal stress is not to exceed 60 N/mm^2 , find the maximum safe air pressure.

[6+10]
