No. of Printed Pages : 3 + Drawing Sheet **BICE-008**

00422

B.TECH. CIVIL ENGINEERING

Term-End Examination

December, 2011

BICE-008 : STRUCTURAL ANALYSIS I

Time : 3 hours *Maximum Marks : 70*

Note : *(1) **All** answers are to be written in **English only.***
*(2) Answer **any seven** question.*
(3) Non-programmable calculators allowed.

---

1. (a) Define stress, strain and Hooke's Law. **4**

(b) Draw stress - strain Diagram for a typical structured steel in tension and mark important parameter proportional limit, **6**

Elastic limit, yield point, ultimate strength, rupture strength on it.

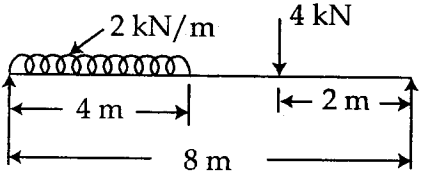
2. (a) Explain Salient Features of "Mohr's Circle". **3**

(b) A metal piece having size 50 mm × 50 mm section is subjected to a tensile load of 320 kN. The extension of a 250 mm gauge length is found to be 0.20 mm and decrease in thickness 0.012 mm. Find the value of Young's modulus and Poisson's ratio. **7**

3. (a) Define hoop stress. 3+7

(b) A pipe of internal diameter 150 mm and 4 mm thick is made of mild steel having a tensile yield stress of 480 N/mm^2. Find the maximum permissible internal pressure if the stress factor on the maximum shear stress to be 4.

4. Draw S.F and B.M. diagram for the following beam. What is the value of maximum B.M. and S.F. ? 10



5. A hallow cast Iron column, hinged at both ends is 4 m long. Its external dia is 200 mm and internal diameter 150 mm. Find the maximum load it can carry if factor of softy is 4. Use the Rankine's Formula. δ_y for cast from = 550 N/mm^2 10

Use formula $P_R = \dfrac{\delta_y A}{1 + a\left(\dfrac{l}{r}\right)^2}$.

6. (a) Define Torsional moment and angle of twist. 4

(b) A solid shaft 10 cm diameter and 4 m in length is subjected to twisting moment which produces maximum shear stress of 60 N/mm^2. Determine the angle of twist in degree, $N = 0.80 \times 10^5$ N/mm^2. 6

7. A beam carries a UDL of 50 kN/m over a span of 2 m, along with an axial compressive force 50 kN. The section of beam is rectangular depth 240 mm width is 120 mm. **10**

Find (a) Maximum fibre stress.

(b) Fibre stress at a point 0.80 m from left end of the beam and 80 mm below neutral axis.

8. (a) Discuss the assumptions in the simple Theory of Bending. **3**

(b) A wooden beam supports UDL of 40 kN/m run over a simply supported span of 4 m. The section is rectangular 200 mm wide × 400 mm deep. Draw the shear distribution and determine **7**

(i) Maximum shear stress.

9. (a) Difference between destructive and non-destructive testing method. **5**

(b) Describe briefly Ultra sonic method of evaluation of strength for existing RCC frames. **5**