Roll No. Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(ANE)/(IE-2008/09 Batch)/ME) (Sem.–3rd)

STRENGTH OF MATERIALS-I

Subject Code : ME-201

Paper ID : [A0801]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

1. Answer briefly :

(a) What are 'normal' and 'shear' stresses ?

(b) What are 'compound' stresses ?

(c) What are 'sagging' and 'hogging' moments ?

(d) Write down relations between shear force and

(i) load distribution

(ii) bending moment in case of beam subjected to continuous loading.

(e) What is bending stress ? What is the difference between bending stress and direct stress ?

(f) What is meant by :

(i) 'polar' modulus

(ii) 'torsional' rigidity

(g) Give at least three practical applications of thin cylinders in industry.

(h) Differentiate between 'column' and 'strut'.

(i) Name various methods to determine slope an

(j) What are the assumptions in Euler's theory o

SECTION-B

2. Explain the 'normal' and 'actual' stress-strain
mild steel. Describe various points and regions.

3. Define 'principal stresses' and 'principal planes
the principal stresses in case of a general biaxial

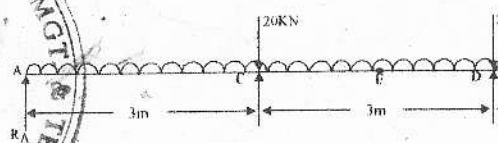
4. A hollow shaft with a diameter ratio 0.7 is requ
at 300 rpm with a uniform twisting moment. All
material is 65 N/mm^2 and twist in a length of 2
degree. Calculate the minimum external diame
these conditions. Modulus of rigidity = 8.2 × 10

5. A cylindrical vessel 2 meters long, 500 mm exte
thick is made of steel. The vessel is subjecte
1 MPa. Calculate the change in external diam
steel E = 200 GPa and γ = 0.3 (Poisson's ratio

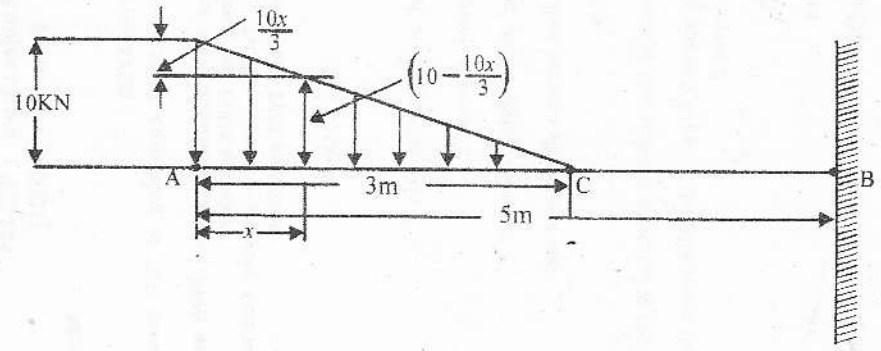
6. Find the Euler's buckling load for a steel colu
2 m long. Both ends of the column can be taken
maximum lateral deflection at buckling. T
τ_y (yield stress) = 240 MPa for steel.

SECTION-C

7. A simply supported beam (as shown in Fig.
u.d.l. of 30 KN/m throughout the length an
20 KN at 3 m from either support. Use moment
the deflection at the mid span and under loads.
Take E = 205 GPa and I = 2.8 × 10^{-4} m^4.



8. Draw the shear force and bending moment diagrams for the cantilever beam shown in Fig. below.



9. Two beams A and B are made of same material. Beam A is of solid circular section while beam B is of hollow circular section whose inner diameter is 60% of the outer diameter. Compare the weight of beams if these are of same strength.