Code No: 134CD

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, November/December - 2020
STRENGTH OF MATERIALS - II
(Common to CE, CEE)

Time: 2 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1. Derive the Torsion equation $\frac{T}{J} = \frac{q}{r} = \frac{N\theta}{L}$. [15]

2. Design a close coiled spring with the mean radius 10 times the diameter of the wire. The spring is required to absorb 2.5 kNm energy with an extension of 100 mm and the maximum shear stress in the spring is not to exceed 75 N/mm ^{2}. Assume the modulus of rigidity is 0.85×10^5 N/mm^2. [15]

3.a) Discuss about different type of columns.
b) Write about beam column. [10+5]

4. A steel hinged-hinged square tubular beam column of size, 60 mm × 60 mm × 5 mm, is 3.6 m long. It is required to carry an axial load of 150 kN in addition to a transverse uniformly distributed load 10 kN/m length over its entire span. Determine the maximum stresses. [15]

5. A masonry retaining wall, 9 m high, is trapezoidal in section, 2 m wide at the top and 5 m at the base, with inclined outside surface. It retains earth at a surcharge angle of 20 ^{0}. The angle of repose is $30^{0.}$ Assume the unit weight of masonry as 20 kN/m^3 and unit weight of earth is 18 kN/m^3. Determine the maximum and minimum stresses at the base of the retaining wall. [15]

6. A circular beam of radius 5 m and uniform cross-section is supported on six symmetrically placed columns. The beam is subjected to a uniformly distributed load of intensity 25 kN/m. Draw the shear force and bending moment diagrams. [15]

7. Explain about Lame's theory for thick cylinder and derive the Lame's formulae. [15]

8. Explain about shear center for symmetrical and unsymmetrical sections. [15]

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