Code No: 134CD

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, July/August - 2021
STRENGTH OF MATERIALS - II
(Common to CE, CEE)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1. Derive the equation $\frac{T}{J}=\frac{q}{r}=\frac{N\theta}{L}$. [15]
2. A close coiled helical spring is to have a stiffness of 1N/mm of compression under a maximum load of 45N and a maximum shearing stress of 126N/mm ^{2}.The solid length of the spring(when the coils are touching) is to be 45mm. Find the diameter of the wire. Take N=4.2×10^4 N/mm^2 (modulus of rigidity). [15]
3. Find an expression for crippling load for a long column when one end of the column is fixed and other end is free. [15]
4. Find Euler's critical load for a hollow cylindrical cast iron column 200 mm external diameter and 25 mm thick, if it is 6m long and hinged at both ends. Take E = 8×10^4 N/mm^2. [15]
5. A masonry dam of trapezoidal section is 12m high with a top width of 2m. The water face has a batter of 1in 12. Find the minimum bottom width necessary so that tensile stresses are not induced on the base section. Masonry weighs 22500 N/m^3 and water weighs 9810 N/m^3. [15]
6. A curved beam, semi circular in plan and supported on three equally spaced supports. The beam carrues a U.D.L of 'w' per unit circular length. Determine the bending moment and twisting moments. [15]
7. A thick spherical shell of 125 mm internal radius and 50 mm thick is subjected to an internal pressure of 5 Mpa. Determine the variation of hoop and radial stresses in the shell. Take E=200 GPa, poissions ratio (υ)=0.30. [15]
8. Explain the concept of un-symmetrical bending. What are the conditions that should be satisfied for a beam to bend with-out twisting? [15]

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