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[Graph Paper]

B.Tech. 7th Semester (ME)
Examination, December-2015

STRENGTH OF MATERIALS-II

Paper-ME-401-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt five questions. Question No. 1 is compulsory and attempt at least one question from each section.

1. Explain the following : 5×4=20
- (a) Castigliano's Theorem
 - (b) Product of Inertia
 - (c) Lamé's Equation
 - (d) Bending in curved bars.

Section-A

2. Derive an expression for strain energy of beam in case of bending. Also find out the deflection in beam. 20
3. Explain various theories of elastic failures with their graphical representations. 20

Section-B

4. What do you understand by shear centre ? Derive the expression for Flexural formula for a curved beam of small radius of curvature subjected to bending. 20
5. Explain wire wound cylinders ? How does wire winding effects hoop stress and longitudinal stress in thin walled cylinder subjected to internal pressure. 20

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Section-C

6. On the outer surface of a closed thick cylinder of diameter ratio 1.5 were fixed strain gauges to measure the longitudinal and circumferential strains. At an internal pressure of 120 N/mm² these strains were recorded as 5.25×10^{-5} and 26.5×10^{-5} respectively. Determine the values of Young's modulus, Modulus of Rigidity and Poisson's ratio. 20

7. Derive an expression for maximum value of hoop stress and radial stress in a hollow cylinder of uniform thickness rotating at a uniform speed ' ω '. 20

Section-D

8. How to find deflection in rings by using Castigliano's Theorem. Explain the procedure by taking a suitable example. 20
9. Derive an expression for strain energy, axial deflection and axial rotation in an open coiled helical spring subjected to both axial load and couple. 20

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