

2013

Structure - III

Paper : 3.5

Full Marks : 100

Time – 3(Three hours)

Each questions contains equal marks 5×20=100

Answer any Five questions.

1. What is Macaulay's method for finding the slope and deflection of a beam? Derive the expression for slope and deflection of a simply supported beam having concentrated load at the centre of the beam. 20
2. A solid circular shaft of 100mm diameter is transmitting 120KW at 150 rpm. Find the intensity of shear stress in the shaft. 20
3. A simply supported beam of 2m span carries a point load of 20KN at its mid-point. Determine the maximum slope and deflection of the beam. Take flexural rigidity of the beam as $500 \times 10^9 \text{Nmm}^2$ 20
4. Derive the equation of Tensional stress and strains in a circular shaft. 20
5. A cantilever beam 120mm wide and 150mm deep is 1.8m long. Determine the slope and deflection at the free end of the beam, when it carries a point load of 20KN at its free end. Take E for the cantilever beam as 200GPa. 20

P.T.O.

(2)

6. What do you understand by term 'column' and 'strut'? Distinguish between long columns and short columns. Explain the failure of long columns. 20
7. Find the crippling load for a hollow cylindrical steel column of 38mm external diameter and 2.5mm thick. Take length of the column a 2.3m and hinged at its both ends. Take $E=2054\text{Pa}$. Also determines crippling load by Rankini's formula using constants as 335MPa and $1/7500$. 20

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