Code No: 153BU **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, October - 2020
STRENGTH OF MATERIALS - I
(Civil Engineering)

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

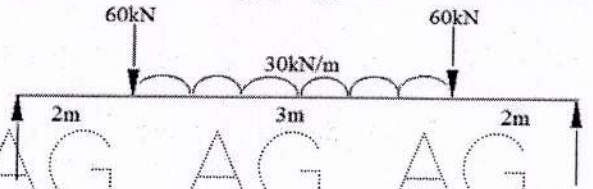
Answer any five questions
All questions carry equal marks

1.a) Derive the relationship between the three elastic constants.
b) Derive an expression for strain energy stored in a body when the load is applied with an impact. [7+8]

2. A steel tube of internal diameter 100mm and external diameter 125mm is surrounded by a brass tube of external diameter 150mm. The composite bar is subjected to an axial pull of 10KN. Find the load carried by each tube and the stresses and strains developed in them if E_s= 200GPa and E_b= 100GPa. [15]

3. A simply supported beam AB of span 10m carries a UDL of 20N/m over 3m from left hand support and also over 4m from the right-hand support. It has also two isolated loads of 20KN and 60KN at 3m and 8m respectively from the left hand support. Draw the B.M and S.F diagrams and calculate the B.M at significant points. [15]

4. Construct S.F.D and B.M.D for a simply supported beam shown in Figure. [15]



5. Obtain the shear stress distribution for a rectangular cross section 230×40mm subjected to a shear force of 40KN. Calculate the maximum and average shear stress. [15]

6. Derive the bending equation from fundamentals M/I = f/y = E/R. [15]

7.a) Determine slope and deflection of a cantilever loaded with a point at the free end using Moment Area method.
b) Find the deflection at the free end of a cantilever of length 'L' subjected to UDL of intensity 'w' per unit length over its entire span. Use Double integration method. [7+8]

8. Derive an expression for the distortion energy per unit volume when a body is subjected to principal stresses σ_1, σ_2 and σ_3. [15]

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