S - 2487

Total No. of Pages : 3

Seat No.	

S.E. (Civil) (Semester - IV) Examination, November - 2015

STRUCTURAL MECHANICS - II (Old)

Sub. Code : 43586

Day and Date : Monday, 30 - 11 - 2015 **Total Marks : 100**

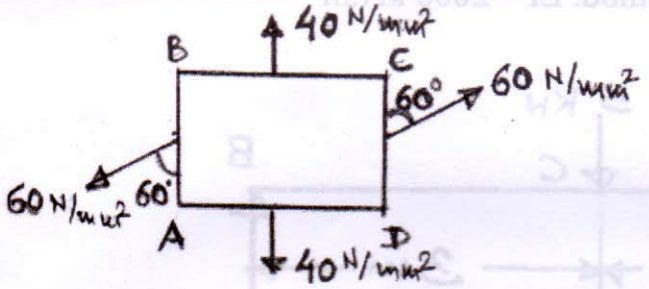
Time : 10.00 a.m. to 01.00 p.m.

Instructions : 1) **Solve any three questions from each section.**
2) **Use of Non programmable calculators permitted**
3) **Figures to the right indicate full marks.**
4) **Assume suitable data, If required and clearly mention it.**

SECTION - I

Q1) a) Explain the terms principal plane and principal stress. **[5]**

b) A point in a strained material is subjected to the stresses as shown in figure below. Locate the principal planes and evaluate the principal stresses. **[12]**



Q2) a) What are different stability conditions of dam under which a dam may fail? **[5]**

b) A masonry retaining wall of trapezoidal section is l0m high. It is subjected to earth pressure on the back and top of the earth is horizontally level with the top of the wall. The width at the top is 2m and at the bottom 8m and exposed face is vertical. If the weight of masonry is 24 kN/m3 and that of earth 16 kN/m3 and the angle of repose of earth be 30°. Find the maximum and minimum intensities of normal stress at the base. **[12]**

P.T.O.

Q3) a) What are the assumptions made in torsion formula? [4]

b) The maximum normal stress and the maximum shear stress analysed for a shaft of 150mm diameter under combined bending and torsion, were found to be l20Mpa and 80Mpa respectiveiy. Find the bending moment and torque to which the shaft is subjected. If the maximum shear stress be limited to l00mpa, find by how much the torque can be increased if the bending moment is kept constant. [12]

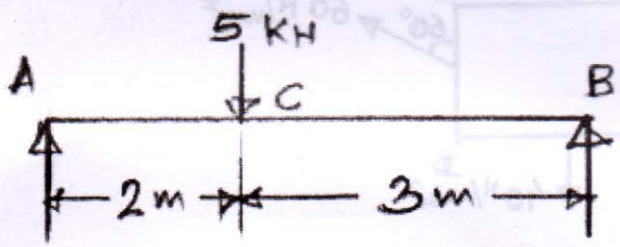
Q4) a) Define the term column and strut and explain the different types of column. [4]

b) Calculate the Euler's critical load for a strut of T-Section, the flange width being 100mm, overall depth 80mm and both flange and stem 10mm thick. The strut is 3m long and built in at both ends. Take E = 2 x 10s N/mm^2. [12]

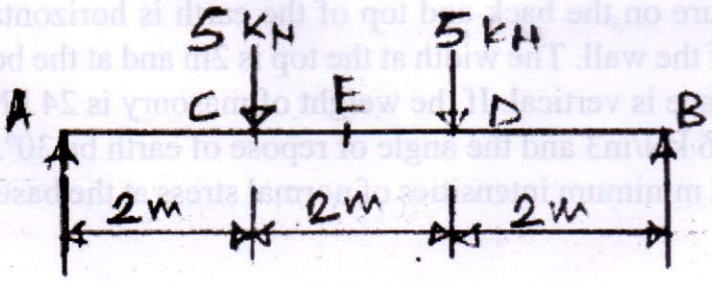
SECTION - II

Q5) a) State Moment Area theorems. [4]

b) Determine the deflection under the load for the beam shown below by Moment Area Method. EI = 2000 kN.m^2 [12]



Q6) Determine the deflection at mid point (E) of the beam shown below by Dummy Load Method. EI = 2000 kN.m^2 [16]

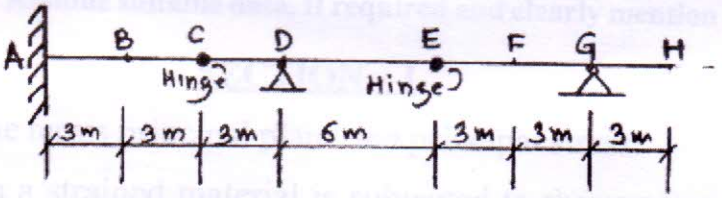


Q7) a) Explain any three theories of failure. **[6]**

b) At a point in the wall of a thin steel tube, there are perpendicular stresses of $10KN/mm^2$ and $5KN/mm^2$ both tensile. Calculate equivalent stress in simple tension using maximum principle strain theory and total strain energy theory. Take $\mu = 0.25$ **[12]**

Q8) a) What are the uses of influence lines? **[4]**

b) Draw ILD for moment at A, moment at B and reaction at D for the compound beam shown in the figure below. The beam has internal hinges at C and E. **[12]**



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