

Code No: R22012

**R10****SET - 1****II B. Tech II Semester Supplementary Examinations, April/May - 2019****STRENGTH OF MATERIALS**

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** QuestionsAll Questions carry **Equal** Marks

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1. A beam of length 6m is simply supported at its end. It carries a uniformly distributed load of 10kN/m as shown in the Figure 1. Determine the deflection of the beam at its midpoint and also the position of the maximum deflection. (15M)

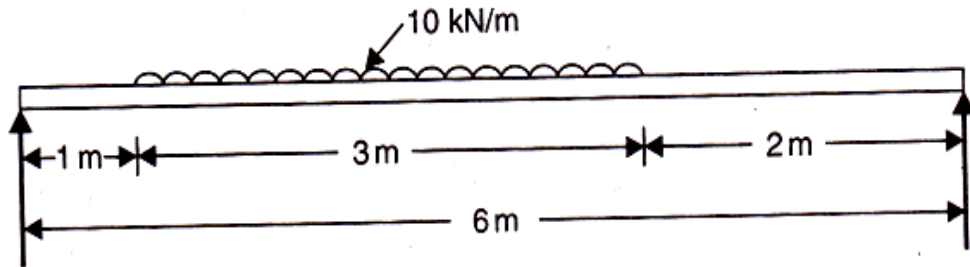
Take  $EI = 4.5 \times 10^8 \text{ N/mm}^2$ 

Figure 1

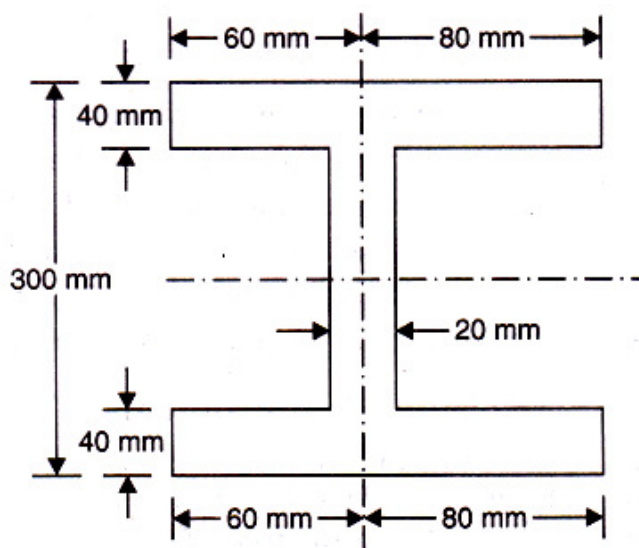
2. Derive the Lami's equation of thick cylinders. (15M)
3. a) Derive an expression for a member subjected to direct stresses in two mutually perpendicular directions. (8M)
- b) Define and explain the maximum principle stress theory of failure. (7M)
4. a) Derive the power transmitted by a shaft (8M)
- b) Derive the deflection of a closely coiled helical spring subjected to axial pull. (7M)
5. a) Derive the equation for the Euler's crippling load for a column with one end fixed and the other end hinged. (12M)
- b) Write the difference between column and a strut. (3M)

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**SET - 1**

6. a) A hollow rectangular column is having external and internal dimensions as (12M)  
120cm deep x 80 cm wide and 90 cm deep x 50cm wide respectively. A vertical  
load of 200kN is transmitted in the vertical plane bisecting 120 cm side at an  
eccentricity of 10cm from the geometric axis of the section. Calculate the  
maximum and minimum stresses in the section.
- b) What do you mean by direct stress and bending stress? (3M)
7. Determine the position of shear centre for an unequal I-section shown in the (15M)  
below figure.



8. Derive the forces in members AD and BD and AC by method of joints. (15M)

