H.T.No. | | | | | | | | | | |

Code No: ME1509 **GEC-R14**

II B. Tech I Semester Supplementary Examinations, June 2017

MECHANICS OF SOLIDS

(Mechanical Engineering)

Time: 3 Hours **Max. Marks: 60**

Note: All Questions from **PART-A** are to be answered at one place.
Answer any **FOUR** questions from **PART-B.** All Questions carry equal Marks.

PART-A

6 × 2 = 12M

1. What is meant by Poisson's ratio?
2. How do you define buckling load?
3. Define point of contra flexure.
4. What are the assumptions in derivation of bending equation?
5. Write the equation to determine the maximum deflection of a simply supported beam carrying uniformly distributed load over entire length.
6. What is the difference between thin and thick cylinders?

PART-B

4 × 12 = 48M

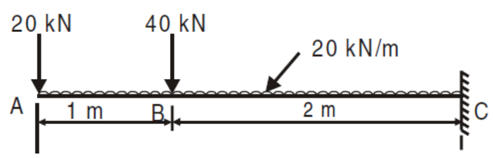
1. a) Derive the relation between three elastic constants. (8M)

   b) A circular rod of diameter 16 mm and 500 mm long is subjected to a tensile force 40 kN. The modulus of elasticity for steel may be taken as 200 kN/mm^2. Find stress, strain and elongation of the bar due to applied load. (4M)

2. a) Draw neat sketches of columns with different end conditions. (6M)

   b) Consider again a rectangular steel bar 40 mm × 50 mm in cross section, pinned at each end and subject to axial compression. The bar is 2 m long and E = 200 GPa. Determine the buckling load using Euler's formula.(6M)

3. Draw the SF and BM diagrams for the beam shown in Fig. (12M)



4. Derive the bending equation starting from fundamentals. (12M)

5. For a cantilever beam with uniformly distributed load over entire length, determine the equation for deflection curve using double integration method .Also determine the maximum deflection of the beam. (12M)

6. The internal and external diameter of a thick hollow cylinder is 80 mm and120 mm respectively. It is subjected to an external pressure of 40 N/mm^2 and an internal pressure of 120 N/mm^2. Calculate the circumferential and radial stresses at the mean radius. (12M)

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