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

Code No: CE1510 **GEC-R14**

II B. Tech II Semester Supplementary Examinations, December 2017

MECHANICS OF SOLIDS-II

(Civil 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

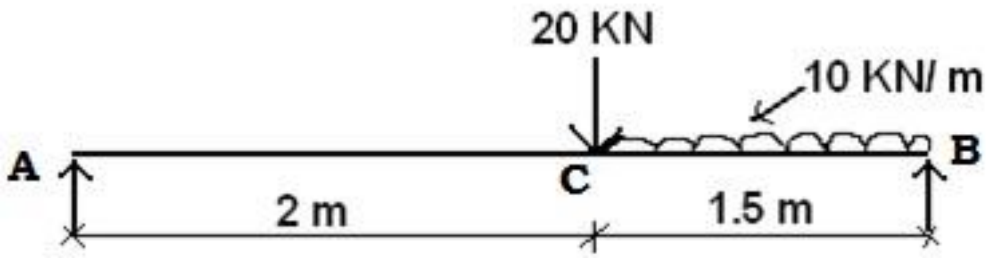
1. Write the expressions for normal and shear stresses on oblique planes .
2. State the Maxwell's reciprocal theorem for strain energy.
3. Describe any two assumptions in the Euler's column theory.
4. Write the expression for maximum deflection of simply supported beam carrying **udl** w/unit length through out the span.
5. List out any two assumptions made for the analysis of thin cylinders.
6. Write any two assumptions for finding the stresses due to un-symmetric bending.

PART-B

4 × 12 = 48M

1. The principal tensile stresses at a point across two perpendicular planes are 80 N/mm^2 and 40 N/ mm^2. Find the normal and tangential stresses and the resultant stress and its obliquity on a plane at 20^0 with the major principal plane. Find also the intensity of stress which acting alone can produce the same maximum strain. Take Poisson's ratio= 1/4? (12M)

2. a) Using Castigliano's theorem determine the deflection of point C of the beam as shown in the figure below EI=4 MN-m^2. (6M)



   b) A bolt is subjected to axial pull of 12 KN together with a traverse shear force of 6 KN. Determine the diameter of the bolt by using maximum principal stress theory. (6M)

3 a) Derive the Rankine's formula of columns. (4M)

   b) Calculate the critical load of strut which is made of a bar, circular in section and 5 m long and which is pin jointed at both ends. The same bar when used as simply supported beam given a mid-span deflection of 10 mm which load 10 KN at the centre. (8M)

4. A simply supported beam of span L subjected to equal loads W/2 at each of one third span points. Find the expressions for deflection under the load and at mid-span using Macaulay's method. (12M)

5. a) Derive the equations of longitudinal stress in thin cylinder. (4M)

   b) A cylindrical shell 3 m long and is having 1 m internal diameter and 15 mm thickness. Calculate the maximum intensity of shear stress induced and also the changes in the dimensions of the shell, if it is subjected to internal fluid pressure 1.5 N/mm^2. (8M)

6. A 200 mm x 200 mm angle is loaded as shown in the figure below. The total load P being 50 KN. Find the direction of neutral axis between the loads also calculate the values of bending stresses at A, B, C. (12M)