Dr. C. P. Gautam

COURSE CODE: 18B11CE415   MAX. MARKS: 25
COURSE NAME: Mechanics of Solids
COURSE CREDITS: 03   MAX. TIME: 1 Hour 30 Min

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

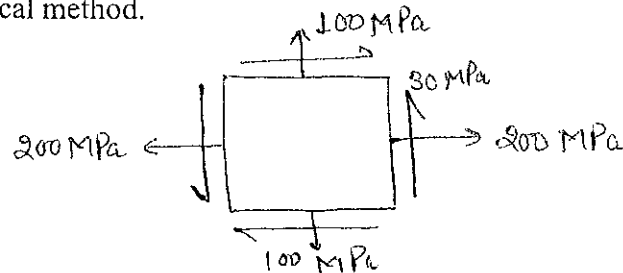**Q1.** (i) Define Principal Stress and Principal Plane and their uses.   [2+2+2 = 6]

(ii) Write the general relationship between load, shear force and bending moment. Also mention the use of bending moment diagram.

(iii) Define point of contraflexure and its effect on bending on beams with diagram.

Q.2. For the given beam, draw the shear force and bending moment diagram and deflection pattern of beam.   [5]
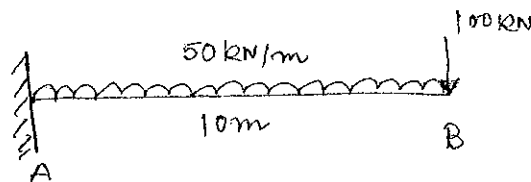
Q.3. For the given state of stress, using empirical formula find new shear stress and normal stresses, if the element is rotated by an angle of 30⁰ in anticlockwise direction. Also match your answer with graphical method.   [6]

Q.3. For the given shear force diagram, draw the loading on beam and bending moment diagram of the beam.   [4]
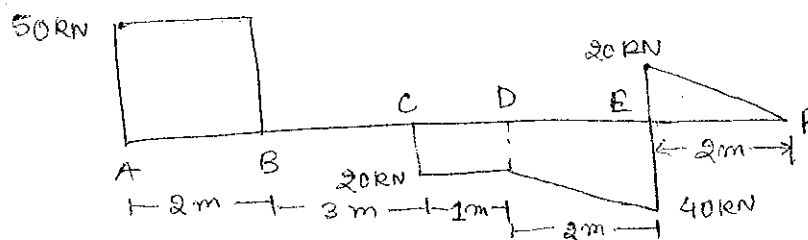
Q.4. For the given state of stress find the principal plane and principal stress using Mohr circle. Also find the maximum shear stress value and the plane on which it is acting.   [4]