COURSE CODE (CREDITS): 18B11CE415 (3) MAX. MARKS: 35

COURSE NAME: MECHANICS OF SOLIDS

COURSE INSTRUCTOR: Mr. Chandra Pal Gautam MAX. TIME: 2 Hours

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

Q1. (i) "Flexural formula is used the determine the optimum shape of beam for a given bending stress". Justify the statement with examples.

(ii) Find the strongest rectangular section that can be cut from a circle of diameter 'D'.

**(iii)** Draw the pattern and location of flexure- shear cracks in a rectangular beam. [1+3+1=5]

Q.2. For the given beam, find the value of maximum bending stress. All dimensions given in cross section of beam are in mm. [7]

Cross – Section
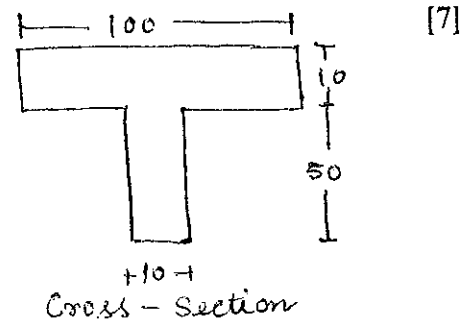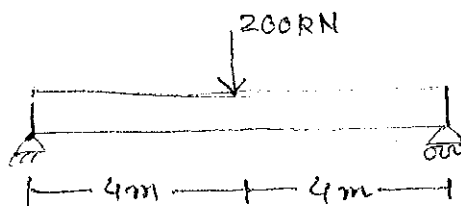
Q.3. For the given beam find the slope and deflection at B using suitable method in term of EI. [5]
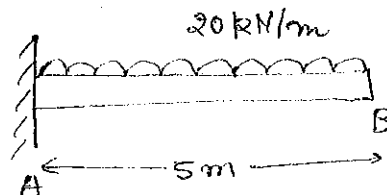

Q.4. For the given beam find the slope at support A and maximum deflection in beam in term of EI by using Macaulay Method. [6]
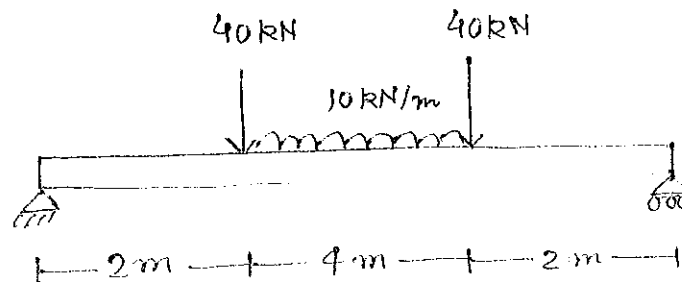
Q.5. (i) For a given rectangular section of beam having width 150 mm and depth 300 mm, find the value of shear stress at a section 75 mm from neutral axis if shear force (V) acting on the section is 180 kN. Also find the maximum value of shear stress on the section.

(ii) For the given sections of the beam, draw the shear stress diagram. [3+3 = 6]
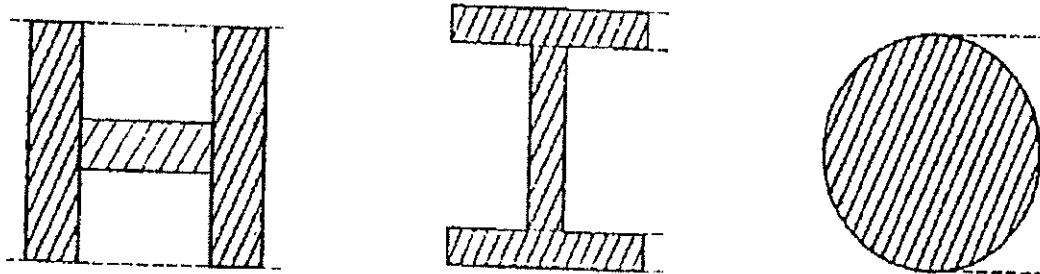
Q.6. A circular shaft of diameter 30 cm and length of 5 m is fixed at one end and free at another end. If a torque of 150 kNm is applied at free end of shaft, find the polar moment of inertia, angle of twist and maximum shear stress on the shaft. Take G = 80 MPa. [6]