JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech- IV Semester (CE)

COURSE CODE(CREDITS): 18B11CE415 (3)

COURSE NAME: Mechanics of Solids

COURSE INSTRUCTORS: Mr. Chandra Pal Gautam

MAX. MARKS: 35

MAX. TIME: 2 Hours

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

Q.1 (a) Draw the shear stress distribution due to torsional moment in a circular shaft. Also explain the difference between bending moment and torsional moment.
**(b)** Draw the pattern of cracks in a beam subjected to vertical loading due to shear stress, bending stress and combination of shear and bending stress.
(c) Mention the type of beams and kind of loading for which Macaulay's method is preferred for finding the slope and deflection in the beam.   [CO-5, CO-3] [2+2+2 = 6]
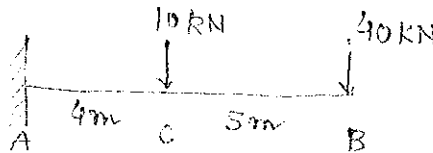
Q.2 Find the slope and deflection for the given beam at B by using Macaulay's method.   [CO – 4] [7]
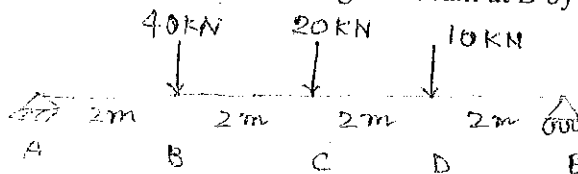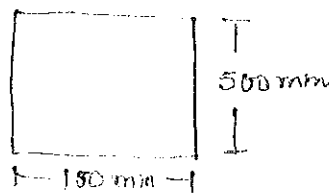

Q.3 Find the slope and deflection for the given beam at 'B' by using Conjugate Beam Method.   [CO – 4] [6]
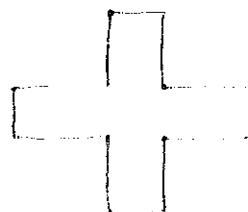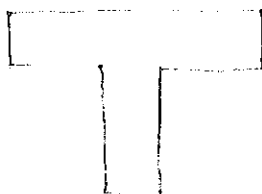

Q.4 Derive the shear stress distribution formula for a rectangular beam. Also find the shear stress at the fiber at a distance of 50 mm from the neutral axis for the given beam. Find maximum shear stress in beam too.   [CO – 4] [7]

Q.5 Draw the shear stress diagram for the given cross sections.   [CO – 5] [4]

Q.6 The internal diameter of a steel shaft = 70% of the external diameter. The shaft is to transmit 3500 kW at 200 rpm. If maximum shear stress is 50 MPa in shaft, calculate the diameter of the shaft. Find also the maximum twist of the shaft, when it is stressed to maximum permissible value. The length of the shaft is 4 m and G = 80 MPa.   [CO – 3] [5]