JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS-2022

B.Tech-III Semester (Civil)

COURSE CODE (CREDITS): 18B11CE315 (3) MAX. MARKS: 35

COURSE NAME: ENGINEERING MECHANICS

COURSE INSTRUCTORS: Dr. Saurav MAX. TIME: 2 Hrs

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

Q1. In a tensile test on a mild steel specimen 12.5mm diameter and gauge length 200mm following results were recorded. **[6, CO4]**

Load (kN)	5	10	15	20	25	30	35	40
Extension (mm)	0.040	0.080	0.12	0.161	0.201	0.242	0.282	0.322

When the specimen was afterwards tested to destruction the maximum load recorded was 58.5kN, the diameter of neck was 7.35mm and the length between the gauge marks was 268.7mm. Determine using graph

i) The value of Young's modulus of elasticity of the material

ii) Ultimate tensile strength

iii) Percentage reduction of area

iv) Percentage elongation

Q2. Determine the coordinates of the centroid of the plane area as shown in Fig. 1 with reference to the axis shown. Take x = 40 mm. **[6, CO3]**

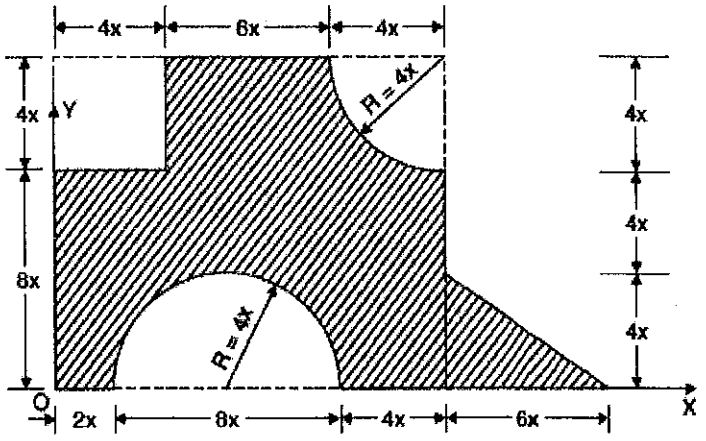

Fig. 1

Q3. Deduce an equation to calculate the Moment of Inertia of a rectangular section from first principle about its centroidal axes. **[5, CO3]**

Q4. A cantilever beam of length 20m carries an uniformly distributed load of 10kN/m for its entire length in addition to a point load of 10kN acting at mid span section. Determine the support reactions developed. **[5, CO1]**

Q5. A truss of 8 meters span is loaded as shown in Fig 2. Find the forces in the members CD, FD and FE of the truss. **[7, CO2]**

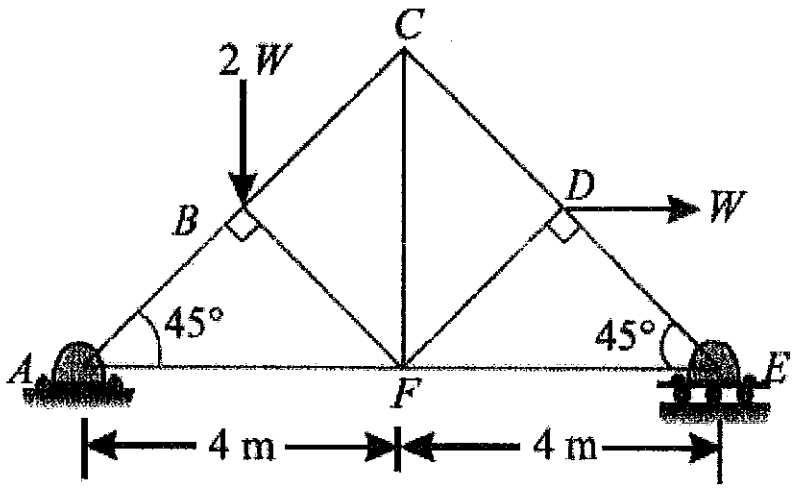

Fig. 2

Q6. Write Short Notes on **any three** **[6, CO1-4]**

a) Equilibrium conditions
b) Characteristics of Couple
c) Difference between center of gravity and centroid
d) Parallel axes and perpendicular axis theorem