ACE
Engineering College
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An AUTONOMOUS Institution
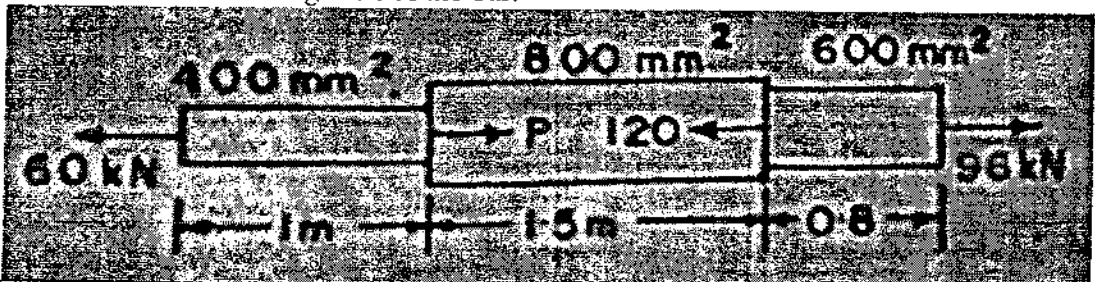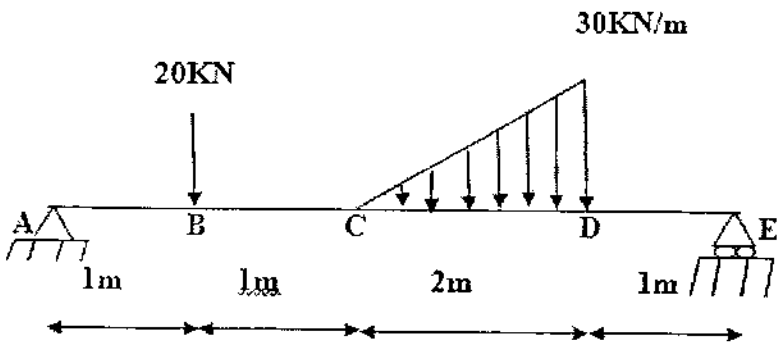
Question Paper Code: | CE303PC | | ACE-R20

Semester Supplementary Examination
II B. Tech- I Semester- SEPTEMBER-2022
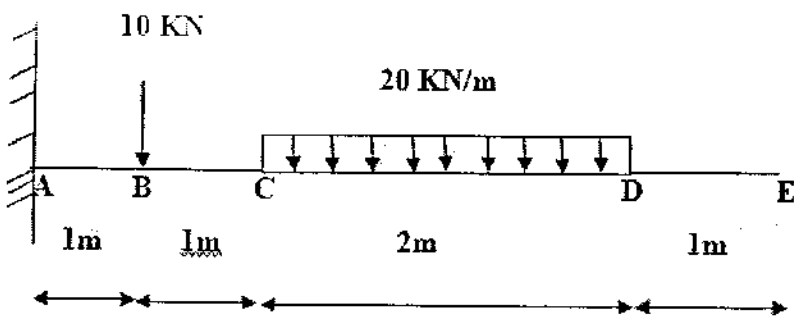### STRENGTH OF MATERIALS-I
(CIVIL Engineering)

Time: 3 Hours | | Max. Marks: 70

H. T. No

Answer any 5 Questions out of 8 Questions from the following

Q.N	Question	Marks
1. a	A steel bar ABCD of varying sections is subjected to the axial forces as shown in below figure. Find the value of 'P' necessary for equilibrium. If E = 210 kN/mm^2, determine the total elongation of the bar.	7
b)	A steel cube of block of 50 mm side is subjected to a force of 10 kN (tension), 12.5 kN (compression) and 7.5 kN (tension) along X, Y and Z directions respectively. Determine the change in volume of the block. Take E = 200 kN/mm^2 and $\mu = 0.3$.	7
2.	Draw Shear Force Diagram & Bending Moment Diagram for a simply supported beam subjected to loads as shown in the figure	14
3. a	State the assumptions and derive the equation in theory of simple bending.	8
b)	A I- section has a flanges width of 250 mm, overall depth 400 mm and thickness 20 mm. Find the maximum flexural stress developed in the beam for a bending moment of 120 kN.m.	6

4.	Draw Shear Force Diagram & Bending Moment Diagram for a cantilever beam subjected to loads as shown in the figure	14
5.	A rectangular beam of 100 mm wide and 250 mm deep is subjected to a maximum shear force of 50 kN. Determine, i) Average Shear Stress ii) Maximum Shear Stress iii) Shear Stress at a distance of 25 mm above the neutral axis.	14
6.	A simply supported beam of span 5m carrying a point load of 30 kN at a distance of 2 m from left end, then a) Determine the slope at left support b) Determine the deflection under load c) Determine the maximum deflection Assume uniform flexural rigidity throughout the beam.	14
7.	At a point in a material under stress, the normal stresses on two mutually perpendicular planes are of 120 MPa (tensile) and 60 MPa (tensile). The shear stress across these planes is 30 MPa. a) Find the Principal stresses and Principal planes b) Find the maximum shear stress and plane of maximum shear stress.	14
8.	The stresses at a point of a machine component are 150 MPa and 50 MPa both tensile on two mutually perpendicular planes. Find the intensities of normal, shear and resultant stresses on a plane inclined at an angle of 55 ° with the axis of major tensile stress. Also determine the direction of the resultant stress and the magnitude of the maximum shear stress.	14