

Reg. No:

--	--	--	--	--	--	--	--	--	--

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester (R16) Regular Examinations November 2017
STRENGTH OF MATERIALS-I
(CIVIL ENGINEERING)**

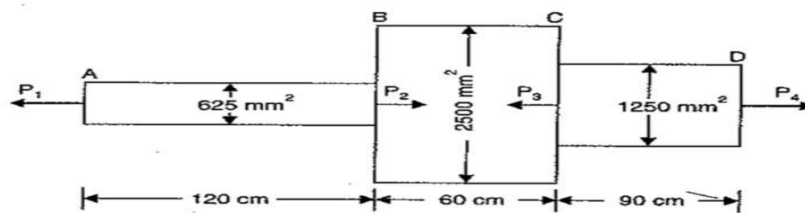
Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 X 12 = 60 Marks)

UNIT-I

- 1 A member ABCD is subjected to point loads P₁, P₂, P₃ and P₄ as shown in figure. Calculate the force P₂ necessary for equilibrium, if P₁=45 kN, P₃=450 kN and P₄=130kN. Determine the total elongation of the member, assuming the modulus of elasticity to be $2.1 \times 10^5 \text{ N/mm}^2$



12M

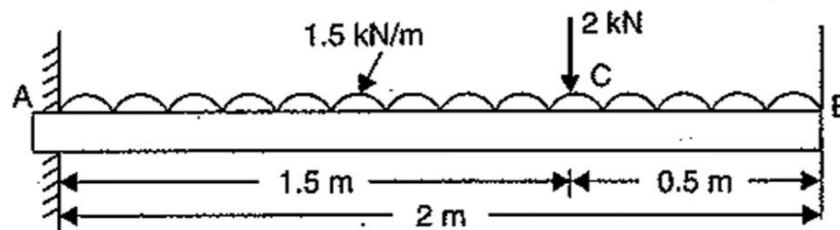
OR

- 2 The modulus of rigidity for a material is $0.51 \times 10^5 \text{ N/mm}^2$. A 10 mm diameter rod of a material was subjected to an axial pull of 10 kN and the changes in diameter was observed to be $3 \times 10^{-3} \text{ mm}$. Calculate Poisson's ratio, E and K.

12M

UNIT-II

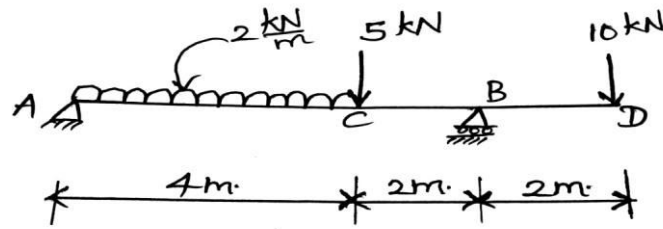
- 3 Draw shear force and bending moment diagram for the following beam



12M

OR

- 4 Draw shear force and bending moment diagram for the following beam



12M

UNIT-III

- 5 A beam is simply supported and carries a uniformly distributed load of 40kN/m run over the whole span. The section of the beam is rectangular having depth as 500mm. If the maximum stress in the material of the beam is 120 N/mm^2 and moment of inertia of the section is $7 \times 10^8 \text{ mm}^4$, find the span of the beam.

12M

OR

- 6 Derive the bending equation $M/I = f/y = E/R$ Writing all the assumptions made

12M

UNIT-IV

- 7 A beam of uniform rectangular section 200 mm wide and 300 deep is simply support at its ends. It carries a uniformly distributed load of 9 kN/m run over the entire span of 5 m. If the value of E for the beam material is $1 \times 10^4 \text{ N/mm}^2$, find : (i) Slope at the supports and (ii) Maximum deflection.

12M

- 8 Derive the expression for slope and deflection of a cantilever beam carrying a point load at the free end by Moment Area method.

12M

UNIT-V

- 9 A Simply supported beam of length 5 m carries a point load of 5 kN at a distance of 3 m from left end. If $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 1 \times 10^8 \text{ mm}^4$ for the beam, determine: (i) slope at left support and (ii) deflection under the point load using conjugate beam method

12M

OR

- 10 A solid circular shaft transmits 75 kW power at 200 rpm. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1° in 2 m length of shaft, and shear stress is limited to 50 N/mm^2 . Take $C = 1 \times 10^5 \text{ N/mm}^2$.

12M

*** END ***