ACE Engineering College
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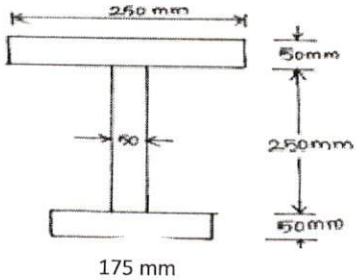
Question Paper Code: CE303PC | ACE-R20

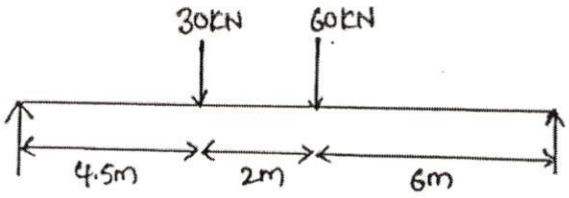
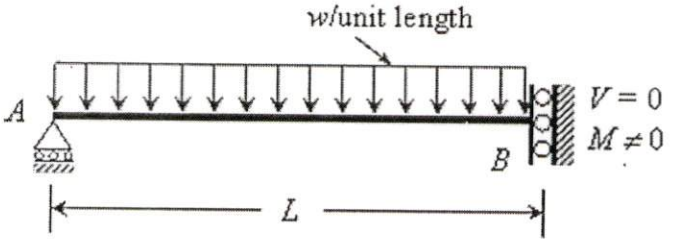
Semester End Examination
II B. Tech- I Semester- MARCH-2022.
STRENGTH OF MATERIALS-1
(Civil Engineering)

Time: 3 Hours **Max. Marks: 70**

H. T. No										

*Answer any 5 **Questions out of 8 Questions** from the following*

Q.No	Question	Marks
1. a)	Sketch a stress-strain diagram for a ductile material like Mild Steel tested under tension up to destruction, marking the salient points on it. Explain the significance of each point.	7
b)	(i) Mention different types of stresses and strains. (ii) Define poission's ratio and factor of safety.	3+4
2.	A beam 6 m long carries a uniformly distributed load of 25 kN/m. The beam is simply supported at left-hand end and the other support is at a point distant x from the right-hand end. (a)Determine the value of x if the mid-point of the beam is to be a point of contraexure and for this position (b)Draw the Shear Force and Bending Moment diagrams.	14
3. a)	State the assumptions for the Simple Bending Theory	4
b)	A cast iron bracket subjected to a bending has a cross section of I-section with unequal flanges as shown in the figure-1. If compressive stress in top flange is not to exceed 17.5N/mm2, what B. M the section can take? If the section is subjected to a S. F of 110kN, draw the shear stress distribution over the depth of the section.  Figure-1	10
4. a)	Derive a relation for change in length of a uniformly varying circular bar subjected to an axial load 'P'	6

b)	A Simply supported beam of length 5m carries a uniformly increasing load of 800N/m run at one end to 1600N/m run at the other end .Draw the shear force and bending moment diagrams also calculate the position and magnitude of maximum bending moment	8
5. a)	Obtain the shear stress distribution for a rectangular cross section 230X400mm subjected to a shear force of 40KN. Calculate the maximum and average shear stress	8
b)	Draw the Shear Force diagram and bending moment diagram for simply supported beam carrying triangular load	6
6. a)	Compute the maximum deflection and support rotations of the following beam using figure-2 a) Method of Integration b) Moment Area method  Figure-2	10
b)	What is the relationship between rate of loading, shear force, slope and deflection at a section of beam.	4
7. a)	Draw the Mohr's circle and indicate the locations of the principal stresses, and maximum shear stresses. From the Mohr's circle find the relative angles between the various planes you located.	6
b)	At a certain point in a strained material, the intensities of Stresses on two planes at right angles to each other are 20N/mm2 and 10N/mm2 both tensile. They are accompanied by a Shear Stress of magnitude 10N/mm2. Find graphically or otherwise the location of principal planes and elevate Principal Stresses.	8
8. a)	Determine the slope at A and deflection of B of the beam shown in figure 3 using the conjugate beam method.  Figure-3	7
b)	Explain in detail about Strain Energy and Von Mises theory	7