Q.P. Code: 18CE0111 **R18**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations March-2021

MECHANICS OF SOLIDS

(Civil Engineering)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	**a**	Write the formulae for hoop, longitudinal and volumetric stress.	**2M**
	b	Write ant three conditions for stability of dam.	**2M**
	c	Define Castiglianos first theorem.	**2M**
	d	What are the applications of three moment equation?	**2M**
	e	What is degree of indeterminacy?	**2M**

PART-B

(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	A copper cylinder, 90cm long, 40cm external diameter and wall thickness 6 mm has its both ends closed by rigid blank flanges. It is initially full of oil at atmospheric pressure. Calculate additional volume of oil which must be pumped into it in order to raise the oil pressure to $5N/mm^2$ above atmospheric pressure. For copper assume $E=1.0X10^5$ N/mm^2 and Poisson's ratio 1/3. Take bulk modulus of oil as $K=2.6X10^3$ N/mm^2.	**10M**

OR

3	Calculate the thickness of metal necessary for a cylindrical shell of internal diameter 160mm to withstand an internal pressure of 8 N/mm^2, if maximum hoop stress in the section is not exceed to $35N/mm^2$.	**10M**

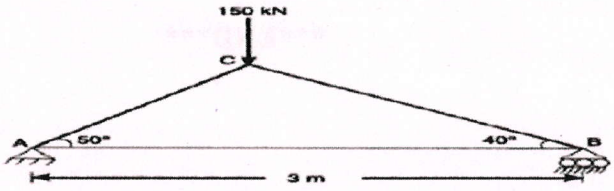
UNIT-II

4	A 45mmX45mmX5 mm angle is used as a SSB over a span of 2.4m. It carries a load of 300N along the vertical axis passing through the centroid of the section. Determine the resulting bending stress on the outer corners of the section, along the middle section of the beam.	**10M**

OR

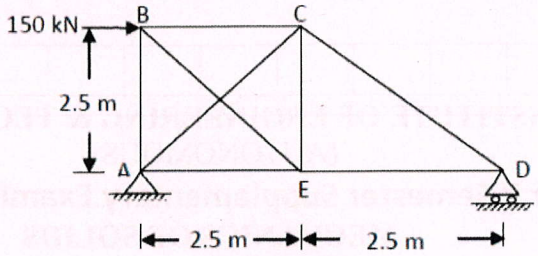
5	Determine the centroidal moment of inertia of the equal section $30X30X10mm^3$.	**10M**

UNIT-III

6	Determine the horizontal and vertical deflection components of joint C of the truss shown in figure below by energy method. Take E = 200 GPa and cross sectional area of each member is $1500X10^{-6}$ m^2. 	**10M**

OR

7	Determine the force in the members AC of a pin-jointed truss shown in figure below. Assume cross sectional area of each member to be $15X10^{-4}$ m^2.	**10M**

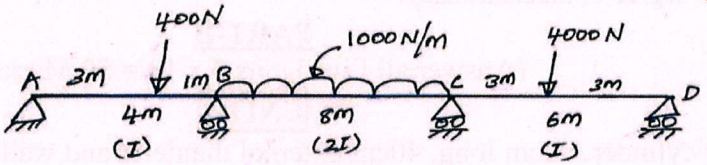


UNIT-IV

8 Calculate the fixed end moments and the reactions at the supports for a fixed beam AB of length 6m. The beam carries point loads of 160KN and 120KN at a distance of 2m and 4m from the left end A. Draw SFD & BMD. **10M**

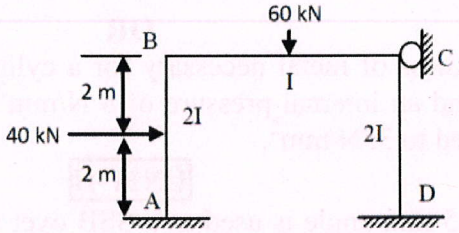
OR

9 A continuous beam ABCD 18m long is loaded as shown in figure below. During loading support 'B' sinks by 10mm Find support moments and plot shear force and bending moment diagrams for the beam. Take E=20kN/mm^2, I=8 X10^6 mm^4. **10M**



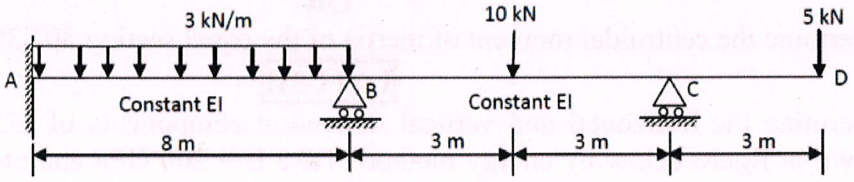
UNIT-V

10 Analyze the portal frame shown in figure below, by slope deflection method. The relative moment of inertia value for each member is indicated in the figure below. Sketch the bending moment diagram **10M**



OR

11 Analyze the continuous beam shown in figure below, using moment distribution method. Draw shear force and bending moment diagram for the continuous beam. **10M**



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