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R18

Course Code: B30402



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech I Semester Supplementary Examinations March-2023

Course Name: THEORY OF ELASTICITY

(Structural Engineering)

Date: 23.03.2023 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions (Compulsory)

Each question carries FOUR marks.

5x4=20M

1. Briefly write a note on components of strain. 4M
2. State Venants principle and its applications. 4M
3. Explain bending of prismatic bars. 4M
4. Describe reciprocal theorem of strain energy. 4M
5. Explain torsion of rolled profile sections. 4M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

6. A). Derive the equation of equilibrium in Cartesian co-ordinates for three dimensional stress field. 10M

OR

6. B). The state of stress at a point with respect to x,y,z co-ordinate system is given below. 10M
Determine the stress tensor to the x',y',z' co-ordinate system obtained by a rotation of

$$30^\circ \text{ about } x \text{ axis } \begin{bmatrix} 20 & 5 & 3 \\ 5 & 10 & 4 \\ 3 & 4 & 15 \end{bmatrix}$$

7. A). A cantilever beam loaded at its free end has Airy's stress function has $\phi = Axy + Bxy^3/6$. Determine an expression for the vertical deflection curve. 10M

OR

7. B). Investigate the what problem of function solve by the stress function $\Phi = (3F/4C) (xy - (xy^3/3C^2)) + (P/2)y^2$. 10M

8. A). Derive the expression for stresses in a plate of infinite dimensions with a central circular hole under Uniaxial uniform section. 10M

OR

8. B). Derive the general three dimensional equations in polar coordinates. 10M

9. A). Describe the procedure of determination of principal stresses and stress invariants. 10M

OR

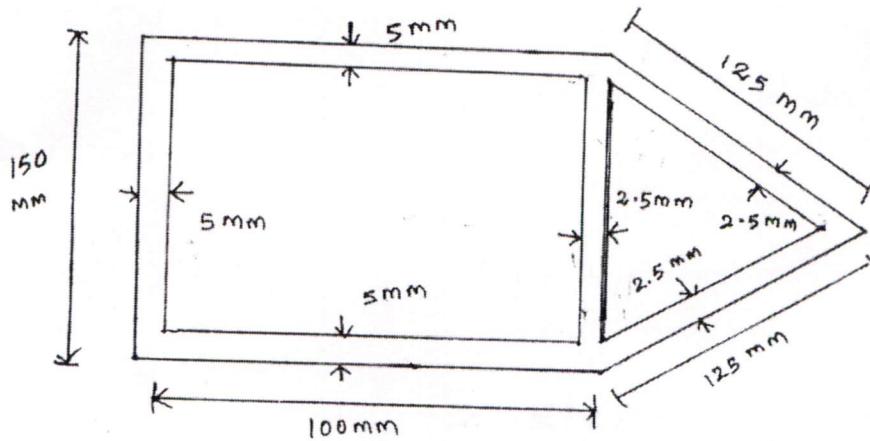
9. B). State and explain reciprocal theorem of strain energy with illustrations. 10M

(P.T.O..)

10. A). A closed thin wall tube has perimeter 'L' and uniform wall thickness 'δ'. An open tube is made by making a fine longitudinal cut in it. Show that when maximum shear stress is the same in both closed and open tubes, $\frac{M_{topen}}{M_{tclose}} = \frac{\delta L \theta_{open}}{6A \theta_{close}} = \frac{2A}{\delta L}$ and that ratio of torsional rigidity is $L^2 \delta^2 / 12A^2$ where A is Area. 10M

OR

10. B). A two cell tube as shown in fig. is subjected to torque 10 kNm. Determine the shear stress in each part and angle of twist per meter length. Modulus of rigidity of the material as 83 kN/mm². 10M



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R18

Course Code: B30401



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech I Semester Supplementary Examinations March-2023

Course Name: **ADVANCED STRUCTURAL ANALYSIS**

(Structural Engineering)

Date: 25.03.2023 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions (Compulsory)

Each question carries FOUR marks.

5x4=20M

1. Distinguish between static Indeterminacy and kinematic indeterminacy. 4M
2. Define band matrix - semi bandwidth. 4M
3. List out four methods which are used to analyze statically determinate pin jointed plane frames. 4M
4. Distinguish between perfect frame and imperfect frame 4M
5. What is Shear Wall and state it's necessity? 4M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

6. A). i) Derive the expression for transformation of stiffness matrix from local to global coordinates. 5M
- ii) Explain the significance of proper-node numbering when analyzing by matrix methods. 5M

OR

6. B). Generate the flexibility matrix for a cantilever beam of span L, flexural rigidity EI, subjected to actions A_1 and A_2 at the free end as shown in figure given below. 10M

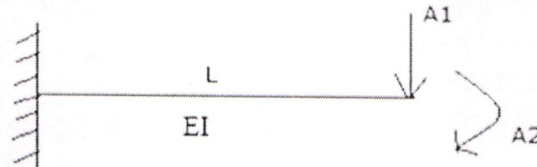


Fig 1

7. A). Explain the general procedure for the assembly of stiffness matrix from element stiffness method. 10M

OR

7. B). Using stiffness method analyze the two-span continuous beam loaded as shown in figure below. 10M

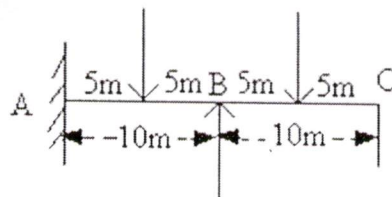


Fig.2

(P.T.O.)

8. A). Illustrate the analysis of continuous beam by the flexibility method taking a simple example. 10M

OR

8. B). Illustrate the analysis of portal frame structure by the flexibility method. 10M

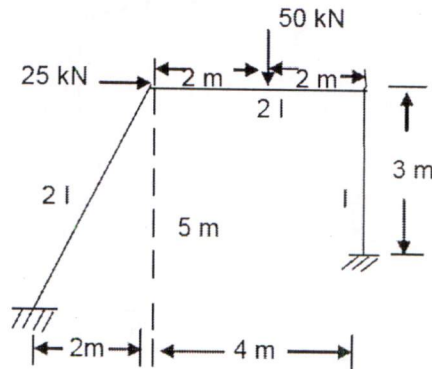


Fig.3

9. A). Illustrate the analysis of given structure by the stiffness method. 10M

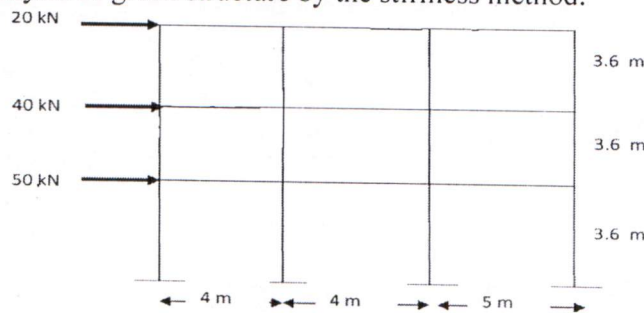


Fig.4

OR

9. B). Determine the global stiffness matrix for the structure given below. Neglect axial deformations in columns. Assume horizontal displacements of node 1 and node 2 as same and assume equal horizontal displacement at nodes 3, 4, and 5. 10M

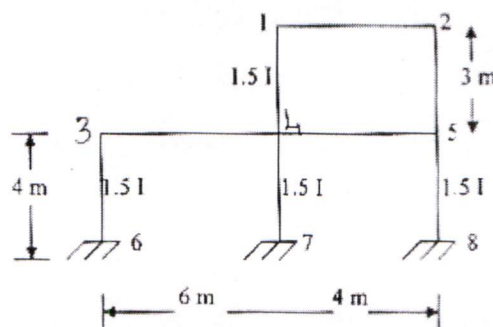


Fig.5

10. A). Describe the structural behavior of large frames with shear walls and without shear walls. 10M

OR

10. B). Explain about approximate analysis of a building as a plane structure. 10M

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Course Code: B30212



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

M.Tech I Semester Supplementary Examinations March-2023

Course Name: RESEARCH METHODOLOGY & IPR

(Common for all Branches)

Date: 29.03.2023 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions (Compulsory)

Each question carries FOUR marks.

5x4=20M

1. What are the qualities of a good researcher? 4M
2. Name the basic principles of research ethics. 4M
3. Write three precautions for writing research report. 4M
4. Explain about trademark. 4M
5. Write the advantages about trade secrets law. 4M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

6. A). What do you mean by research? Explain its significance in modern times. 10M
- OR**
6. B). "Research is much concerned with proper fact finding, analysis and evaluation". Do you agree with this statement? Give reasons in support of your answer. 10M
7. A). Write the principles of ethics in science and engineering Research? 10M
- OR**
7. B). What are the major issues in conducting research? Explain with example. 10M
8. A). Explain the layout of research paper enumerating the various fields in it. 10M
- OR**
8. B). Write the different types of reports, particularly pointing out the difference between a technical report and a popular report. 10M
9. A). Discuss some of the important considerations when commercializing intellectual property. 10M
- OR**
9. B). State the provisions for procedure of registration and assignment of a copyright. 10M
10. A). List at least 10 geographical indications tagged products in India. 10M
- OR**
10. B). Explain new developments in the copyright protection following: Computer programs and Videogames. 10M
