VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

-

VI SEMESTER

CE6602 -STRUCTURAL ANALYSIS II

Regulation – 2013

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Prepared by

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SUBJECT : CE6602 -STRUCTURAL ANALYSIS II

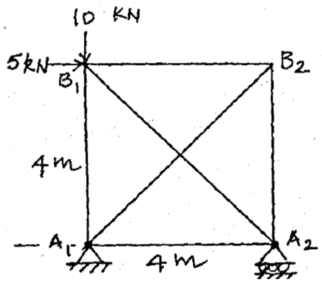
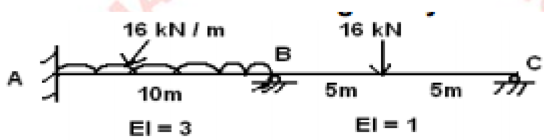
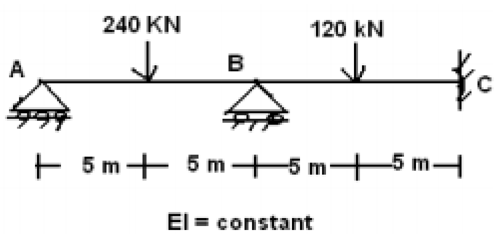
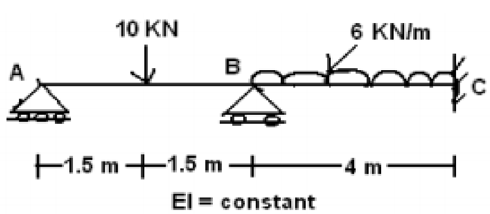
SEM / YEAR: VI/III

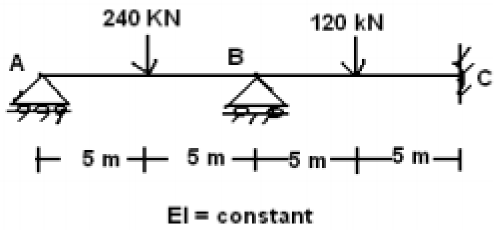
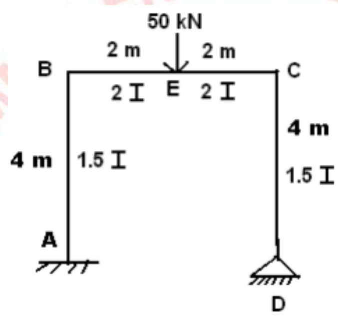
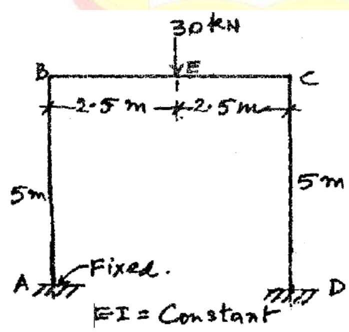
UNIT I - FLEXIBILITY METHOD

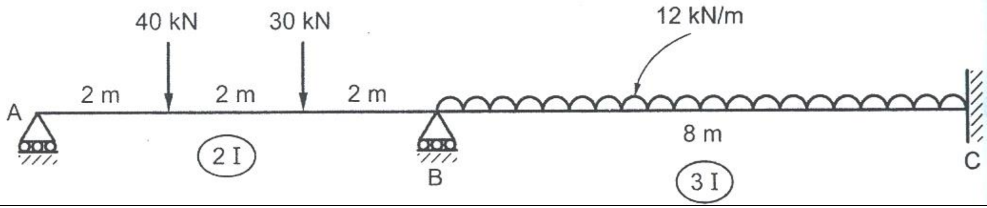
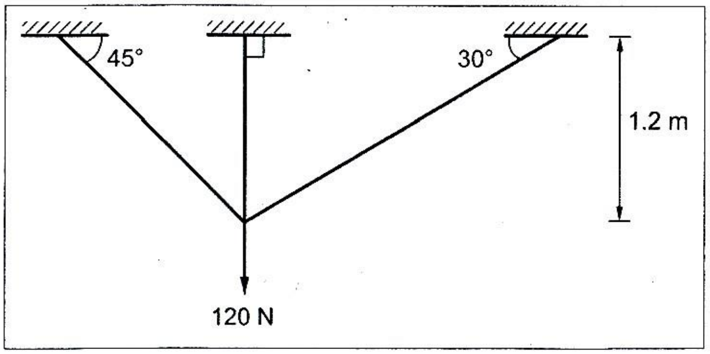
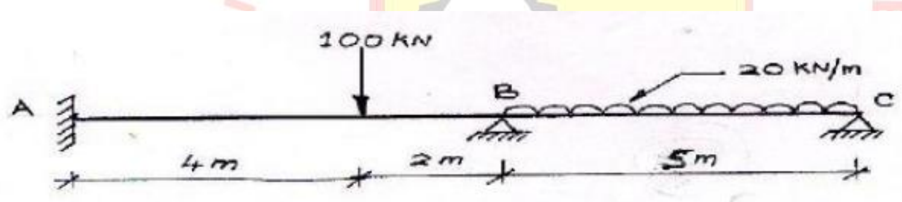
SYLLABUS

Equilibrium and compatibility – Determinate vs Indeterminate structures – Indeterminacy - Primary structure – Compatibility conditions – Analysis of indeterminate pin-jointed plane frames, continuous beams, rigid jointed plane frames (with redundancy restricted to two).

Q.No	PART-A	BT Level	Competence
1.	What are the conditions to be satisfied for determinate structures and how areindeterminate structures identified?	BT1	Remember
2.	Write down the equation for the degree of static indeterminacy of the pin jointed Plane frames, explain the notations used.	BT5	Evaluate
3.	Give the mathematical expression for the degree of static indeterminacy of rigid jointed plane frames.	BT2	Understand
4.	What are the properties which characterize if the structure response by means of force-displacement relationship?	BT5	Evaluate
5.	List the classical methods of structural analysis.	BT1	Remember
6.	What is meant by flexibility?	BT2	Understand
7.	In flexibility method unknown quantities are ---------------------and final equations are-------------	BT3	Application
8.	Define indeterminate structures.	BT1	Remember
9.	What is a primary structure?	BT2	Understand
10.	What are equilibrium equations?	BT2	Understand
11.	What are the different methods of analysis of indeterminate structures?	BT4	Analyze
12.	Differentiate Stiffness method from flexibility method.	BT1	Remember
13.	What are the basic requirements of structural analysis?	BT3	Application
14.	Write the equation for degree of indeterminacy of 2D trusses.	BT6	Create
15.	What is meant by compatibility condition?	BT1	Remember
16.	Write the element Flexibility matrix for a beam member and truss member.	BT6	Create
17.	Define flexibility coefficient.	BT3	Application
18.	Choose the correct answer. The flexibility method is best suited when the static indeterminacy is ------------- the kinematic indeterminacy. (a) Less than (b) Equal to (C) Greater than .	BT4	Analyze
19.	List the variables in the force method.	BT1	Remember
20.	Define External and Internal indeterminacy.	BT4	Analyze

<table>
<tr><th>Q.No</th><th>PART - B</th><th>BT Level</th><th>Competence</th></tr>
<tr><td>1.</td><td>Analyse the pin-jointed plane frame shown in Fig below by flexibility matrix method. The flexibility for each member is 0.0025 mm/KN.

</td><td>BT4</td><td>Analyze</td></tr>
<tr><td>2.</td><td>Analyse the continuous beam ABC shown in Fig below by flexibility matrix method and draw the bending moment diagram. R_B and R_C are redundant

</td><td>BT4</td><td>Analyze</td></tr>
<tr><td>3.</td><td>Generate the flexibility matrix of beam ABC as shown in figure, below by flexibility matrix method and sketch the bending moment diagram

</td><td>BT5</td><td>Evaluate</td></tr>
<tr><td>4.</td><td>A two span continuous beam ABCD is fixed at A and hinged at support B and C. span of AB =Span of BC =9m. Arrange the flexibility influence co-efficient matrix assuming vertical reaction at B and C as redundant.</td><td>BT3</td><td>Application</td></tr>
<tr><td>5.</td><td>Calculate the deflection and moments of continuous beam shown in Fig below using force method.

</td><td>BT1</td><td>Remember</td></tr>
<tr><td>6.</td><td>A cantilever is subjected to a single concentrated load P at the middle of the</td><td>BT1</td><td>Remember</td></tr>
</table>

	span. Calculate the deflection at the free end using flexibility matrix method. EI is uniform throughout.		
7.	Analyze the continuous beam ABC shown in Fig below by flexibility matrix method and draw the bending moment diagram. M_A and M_B are redundant 	BT1	Remember
8.	A portal frame ABCD with supports A and D are fixed at same level carries a uniformly distributed load of 80kN/m on the span AB. Span AB=BC=CD=9m. EI is constant throughout. Analyze the frame by stiffness matrix method.	BT1	Remember
9.	Solve the portal frame ABCD shown in Fig below by flexibility matrix method and sketch the bending moment diagram. 	BT2	Understand
10.	Solve the portal frame ABCD shown in Fig below by flexibility matrix method and sketch the bending moment diagram. 	BT3	Application
11.	A portal frame ABCD with supports A and D are fixed at same level carries a concentrated load of 100kN at centre of the span AB. Span AB=BC=CD=10 m. EI is constant throughout. Analyze the frame by stiffness matrix method.	BT4	Analyze
12.	Examine the moment of the continuous beam shown in Fig below by flexibility method.	BT1	Remember

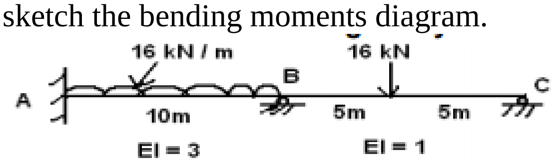
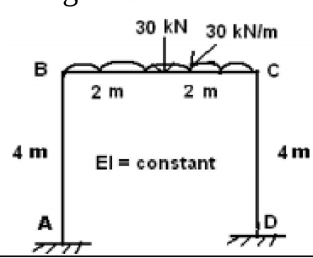
			
13.	Estimate the forces in all the members of the pin-jointed frames shown in Fig below by flexibility method, AE = constant. 	BT2	Understand
14.	A cantilever beam is subjected to an udl of'w'kN/m throughout the entire span. Calculate the deflection at the free end using flexibility matrix method. EI is uniform throughout.	BT2	Understand
Q.No	**PART - C**	**BT Level**	**Competence**
1.	Analyze the continuous beam shown in figure using stiffness matrix method. EI is constant. 	BT1	Remember
2.	A cantilever of length 15m is subjected to a single concentrated load of 15kN at the middle of the span. Find the deflection at the free end using flexibility matrix method. EI is uniform throughout.	BT2	Understand
3.	A two span continuous beam ABC is fixed at A and hinged at support B and C. Span AB=BC=9m. Set up flexibility influence coefficient matrix assuming vertical reaction at B and C as redundant.	BT2	Understand
4.	A portal frame ABCD with supports A and D are fixed at same level carries a uniformly distributed load of 50kN/m on the span AB. Span AB=CD=6m and Span BC=4m. EI is constant throughout. Analyze the frame by flexibility matrix method.	BT1	Remember

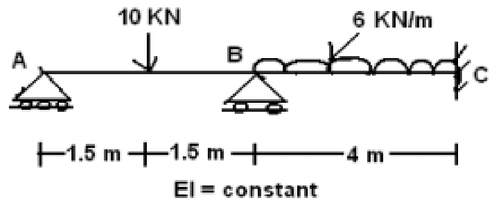
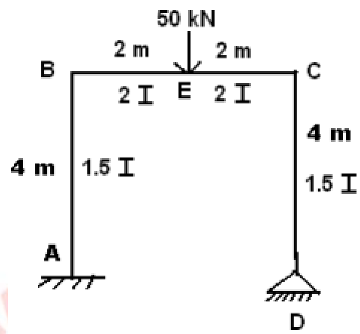
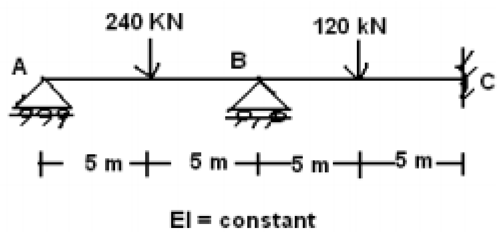
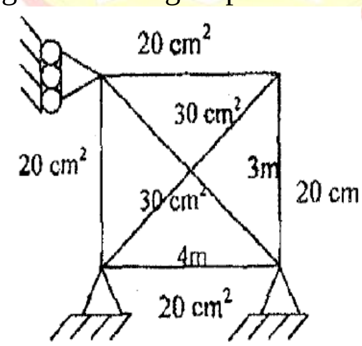
UNIT II - STIFFNESS MATRIX METHOD

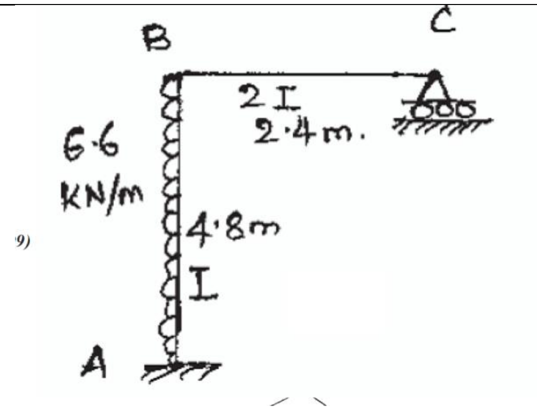
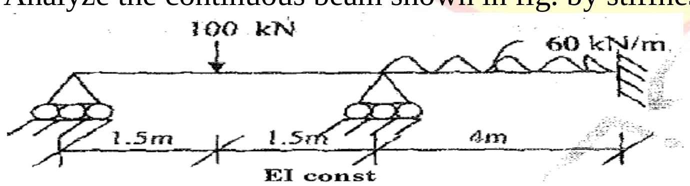
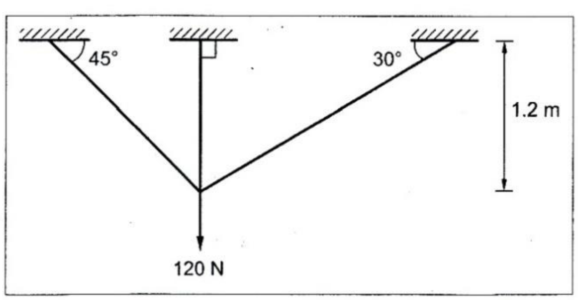
SYLLABUS

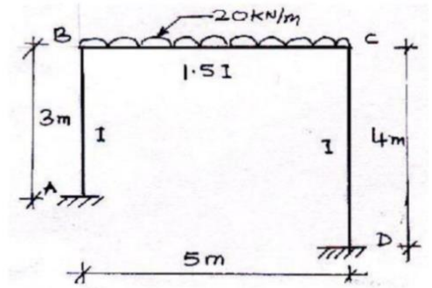
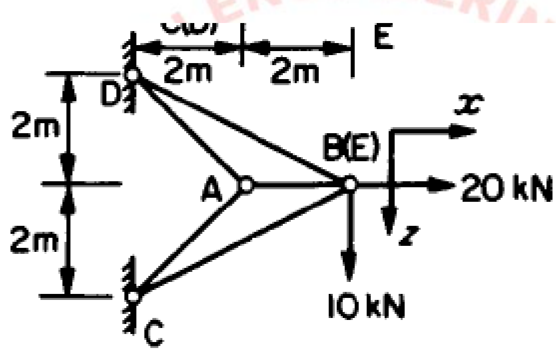
Element and global stiffness matrices – Analysis of continuous beams – Co-ordinate transformations – Rotation matrix – Transformations of **stiffness matrices,** load vectors and displacements vectors – Analysis of pin-jointed plane frames and rigid frames (with redundancy limited to two)

Q.No	PART-A	BT Level	Competence
1.	Define degree of freedom of the structure with an example.	BT1	Remember
2.	Explain the global stiffness matrices.	BT4	Analyze
3.	What are the basic unknowns in stiffness matrix method?	BT1	Remember
4.	What is transformation matrix?	BT3	Application
5.	Define Local and Global coordinates.	BT1	Remember
6.	Define Stiffness coefficient kij.	BT2	Understand
7.	Write down the rotation matrix for 2D beam element.	BT1	Remember
8.	Which property of a structure determines the size of its stiffness matrix?	BT5	Evaluate
9.	Explain the terms stiffness matrix and flexibility matrix. Show that these are inverse of each other.	BT6	Create
10.	What is meant by relative stiffness of a member?	BT5	Evaluate
11.	Create the stiffness matrix for a 2D beam element	BT3	Application
12.	Explainthe steps involved in stiffness matrix method of analysis.	BT2	Understand
13.	Write a note on element stiffness matrix.	BT4	Analyze
14.	Is it possible to develop the flexibility matrix for an unstable structure?	BT1	Remember
15.	Differentiate between flexibility and stiffness.	BT2	Understand
16.	Explain about the properties of stiffness matrix.	BT1	Remember
17.	How are the basic equations of stiffness matrix obtained?	BT6	Create
18.	Explain about generalized coordinates.	BT3	Application
19.	Explain the equilibrium condition used in the stiffness method.	BT4	Analyze
20.	Derive the stiffness matrix of a typical pin-jointed two-dimensional frame element.	BT2	Understand

Q.No	PART-B	BT Level	Competence
1.	Analyse the continuous beam ABC shown in Fig below By stiffness method and also sketch the bending moments diagram. 	BT4	Analyze
2.	Analyse the portal frame ABCD shown in Fig below by stiffness method and also sketch the bending moment diagram. 	BT1	Remember

3.	Examine the continuous beam ABC shown in Fig below by stiffness method and also draw the shear force diagram.  	BT1	Remember
4.	Analyze the portal frame ABCD shown in Fig below by stiffness method and also estimate the bending moment.  	BT2	Understand
5.	Compute the final forces of continuous beam shown in Fig below using displacement method.  	BT5	Evaluate
6.	Analyse the truss shown in Fig below using displacement method.  	BT4	Analyze
7.	Solve the portal frame shown in Fig below by matrix stiffness method and sketch the SFD and BMD. Given El is constant.	BT3	Application

			
8.	A two span continuous beam ABC is fixed at A and simply supported over the supports B and C. AB=6m and BC = 4m. Moment of inertia is constant throughout. A uniformly distributed load of 2 Ton/m acts over AB and a single concentrated load of 6 tons acts on BC. EstimateBMby stiffness matrix method.	BT2	Understand
9.	A portal frame ABCD with A and D are fixed at same level carries a uniformly distributed load of 2 tons /meters. EI is constant throughout. Assess the final forces by stiffness matrix method. Take Span AB=BC=CD=6m.	BT6	Create
10.	A continuous beam ABC is fixed at A and simply supported over the supports B and C. AB = 11m and BC = 9m. Moment of inertia is constant throughout. A single concentrated central load of 12 tons acts on AB and a uniformly distributed load of 10Tons/m acts over BC,examine the final forces by stiffness matrix method and draw BMD.	BT1	Remember
11.	A continuous beam ABCB is simply supported over the supports A, B, C and D. AB = 10m , BC = 8m and CD=10m. Moment of inertia is constant throughout. A single concentrated central load of 12 tons acts on AB and a uniformly distributed load of 10Tons/m acts over BC,examine the final forces by stiffness matrix method and draw BMD.	BT1	Remember
12.	Analyze the continuous beam shown in fig. by stiffness matrix method 	BT4	Analyze
13.	A portal frame ABCD with A and D are fixed at same level Span AB carries a uniformly distributed load of 20kN /meters. EI is constant throughout. Assess the final forces by stiffness matrix method. Span	BT6	Create
14.	Estimate the forces in all the members of the pin-jointed frames shown in Fig below by Stiffness matrix method, AE = constant. 	BT2	Understand

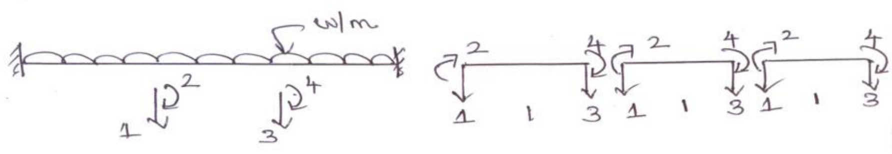
Q.No	PART-C	BT Level	Competence
1.	Solve the portal frame ABCD shown in Fig below by stiffness matrix method . 	BT3	Application
2.	A portal frame ABCD with A and D are fixed at same level span AB=6m carries a uniformly distributed load of 20kN /meters. Span BC = CD=5m carries uniformly distributed load of 5kN/m EI is constant throughout. Assess the final forces by stiffness matrix method.	BT6	Create
3.	Estimate the forces in all the members of the pin-jointed frame as shown in Fig below by Stiffness matrix method, AE is constant for all members. 	BT2	Understand
4.	A three span continuous beam ABCD is fixed at A and D and hinged at support B and C. Span AB=BC=CD=5m carries uniformly distributed load of 8kN/m throughout the beam. Analyze by Stiffness Matrix method	BT4	Analyze

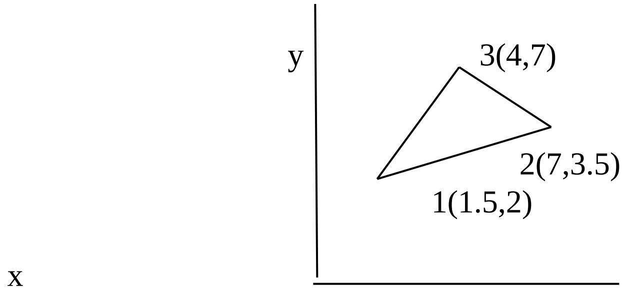
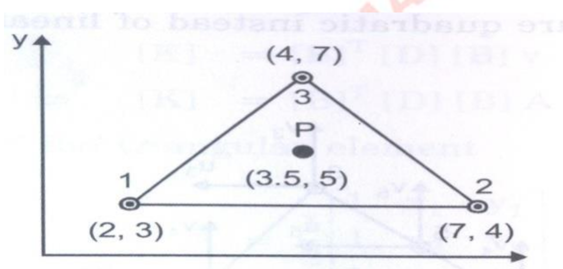
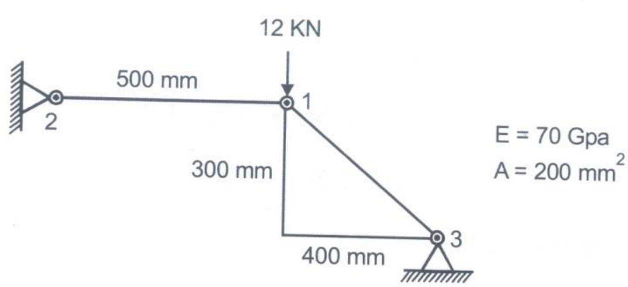
UNIT III - FINITE ELEMENT METHOD

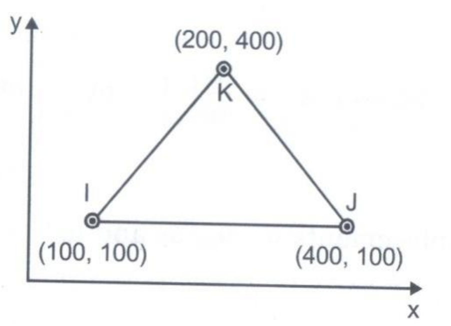
SYLLABUS

Introduction – Discretisation of a structure – Displacement functions – Truss element – Beam element – Plane stress and plane strain - Triangular elements

Q.No	PART-A	BT Level	Competence
1.	Tell in few lines about finite element method.	BT1	Remember
2.	List out the advantages of FEA.	BT1	Remember
3.	Define displacement function.	BT2	Understand
4.	What are the factors governing the selection of finite elements?	BT1	Remember
5.	Define aspect ratio	BT3	Application
6.	Define Shape function	BT1	Remember

7.	Summarize about discretization	BT1	Remember
8.	Describe a beam element.	BT3	Application
9.	Discuss any two terminology in FEM	BT1	Remember
10.	Classify the elements used in FEM?	BT5	Evaluate
11.	Show the possible locations for nodes in a triangular element.	BT2	Understand
12.	Order the basic steps in finite element method.	BT4	Analyze
13.	Explain 2-D elements with example	BT4	Analyze
14.	Explain 3-D elements with example	BT4	Analyze
15.	Explain triangular elements	BT4	Analyze
16.	Generalize the properties of shape functions.	BT2	Understand
17.	Compose the plane stress condition	BT6	Create
18.	Compose the disadvantages of FEM	BT6	Create
19.	Explain finite element.	BT5	Evaluate
20.	Compare 2-D and 3-D elements	BT5	Evaluate
	PART – B		
1.	List out the step by step procedure in finite element analysis	**BT1**	Remember
2.	Derive the Shape Function for a one dimensional linear bar element	**BT1**	Remember
3.	Describe the shape functions for plane stress and strain element.	**BT1**	Remember
4.	Derive the Stiffness Matrix for a one dimensional linear bar element	**BT2**	Understand
5.	Derive the Shape Function for a two noded bar element	**BT2**	Understand
6.	Calculate the element load vectors and global load vector for the system in the fig. 	**BT3**	Application
7.	Calculate the shape functions N1, N2,N3 at the interior point P(3.85,4.8) for the triangular element shown in fig	**BT3**	Application

			
8.	Write the shape function for two noded beam element	**BT4**	Analyze
9.	Enumerate CST and find its Shape function	**BT5**	Evaluate
10.	**Determine the shape function at the interior point P for the triangular element as shown in figure** 	**BT6**	Create
11.	For the two bar truss shown in figure. Determine the displacement of node 1 and the stress in element 1-3. 	**BT2**	Understand
12.	For the CST element shown in figure, Write the strain-displacement matrix.	**BT3**	Application

	Take t=20 mm and E=2x10^5MPa 		
13.	Determine the stiffness matrix for the constant strain triangular CST element. The Co-ordinates are given in the unit of millimeter. Assume plane Stress Conditions. Take E = 210 GPa γ = 0.25 and t = 10 mm	BT1	Remember
14.	Explain i) Constant Strain Triangle (ii) Linear Strain Triangle	**BT2**	Understand

Q.No	PART-C	BT Level	Competence
1	Draw the typical finite elements. Explain with a triangular element model for displacement formulation	BT1	Remember
2	With a Two dimensional triangular element model, derive for the displacement in the matrix form	BT2	Understand
3	Explain in detail about the 4 noded rectangular element to arrive the stiffness matrix	BT3	Application
4	Explain the terminologies in FEM	BT1	Remember

UNIT IV - PLASTIC ANALYSIS OF STRUCTURES

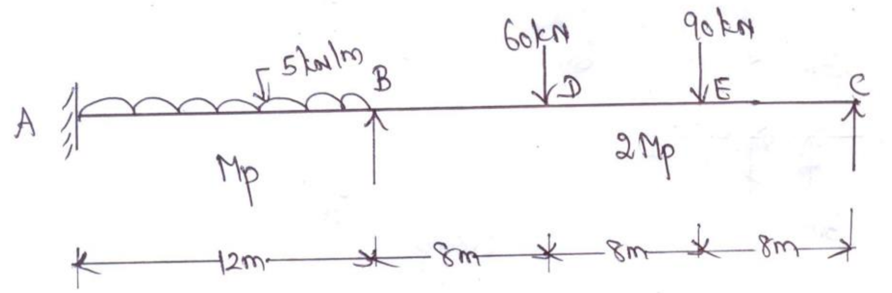
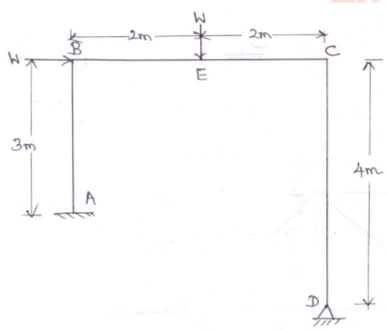
SYLLABUS

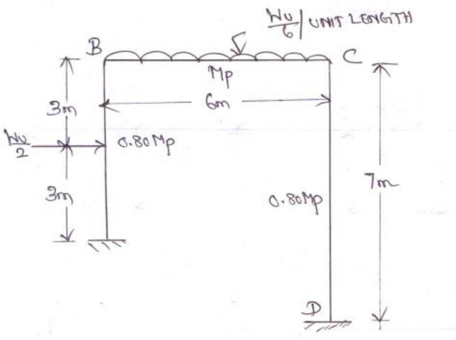
Statically indeterminate axial problems – Beams in pure bending – Plastic moment of resistance – Plastic modulus – Shape factor – Load factor – Plastic hinge and mechanism – Plastic analysis of indeterminate beams and frames – Upper and lower bound theorems

Q.No	PART-A	BT Level	Competence
1.	Define plastic hinge.	BT1	Remember
2.	Define mechanism.	BT1	Remember
3.	Differentiate between plastic hinge and mechanical hinge.	BT2	Understand
4.	Define collapse load	BT1	Remember

5.	Write the assumptions made for plastic analysis.	BT3	Application
6.	Define shape factor.	BT1	Remember
7.	List out the shape factors for the following sections. a) Rectangular section, b) Triangular section, c) Circular section, d) Diamond section	BT1	Remember
8.	Write the section having maximum shape factor	BT3	Application
9.	Define load factor	BT1	Remember
10	Compose upper bound theory	BT5	Evaluate
11	Discuss lower bound theory.	BT2	Understand
12	Classify the different types of mechanisms.	BT4	Analyze
13	Classify the types of frames.	BT4	Analyze
14	Explain about symmetric frames and how are they analyzed.	BT4	Analyze
15	Explain about unsymmetrical frames and how are they analyzed.	BT4	Analyze
16	Describe plastic modulus of a section.	BT2	Understand
17	Formulate the shape factor of a hollow circular section in terms of the shape factor of an ordinary circular section.	BT6	Create
18	Formulate the governing equation for bending.	BT6	Create
19	Compose the theorems for determining the collapse load.	BT5	Evaluate
20	Compose plastic moment of resistance.	BT5	Evaluate

Q.No	PART – B	BT Level	Competence
1.	Calculate the shape factor for a i)rectangle section of breadth'b' and depth 'd', ii)diamond section of breadth'b' and depth'd'.	**BT3**	Application
2.	Calculate the shape factor for a triangle a)centroid lying at d/3 from the base of depth'd',andbreadth'b'. b)circular section of dia 'D'.	**BT3**	Application
3.	A mild steel I-section 200mm wide and 250mm deep has a mean flange thickness of 20mm and a web thickness of 10mm.Analyse the S.F. and the fully plastic moment if σ_y=252N/mm².	**BT4**	Analyze
4.	Analyse the shape factor of the I-section with top flange 100mm wide,bottom flange 150mm wide,20mm tk and web depth 150mm and web thickness 20mm.	**BT4**	Analyze
5.	Examine the shape factor of the T-section of depth 100mm and width of flange100mm,flangethickness and webthickness 10mm.	**BT1**	Remember
6.	Acontinuous beam ABC is loaded as shown in the Fig 4.1Examine the required M_p if the load factor is3.2.	**BT1**	Remember

	 Fig 4.1		
7.	A two span continuous beam ABC has span length AB=6m and BC=6m and carries an udl of 30 kN/m completely covering the spans AB and BC.A and C are simple supports.If the load factor is 1.8 and the shape factor is 1.15 for the I-section , Evaluate the section modulus,assume yield stress for the material as 250N/mm².	**BT5**	Evaluate
8.	Evaluate the collapse load for the frame shown in the Fig 4.2,M_p is the same for all members.  Fig 4.2	**BT5**	Evaluate
9.	Analyse the collapse load for the portal frame loaded as shownin the Fig 4.3.  **Fig 4.3**	**BT2**	Understand

10.	Assess the collapse load for the loaded frame loaded as shown in the Fig 4.4  **Fig 4.4**	**BT6**	Create
11.	A fixed beam of span 'l' carries a uniformly distributed load 'w' on the right half portion. Find the value of collapse load $W_{c.}$ The beam is of uniform moment of resistance.	**BT5**	Evaluate
12.	A Simply supported beam of span 5m is to be designed for a UDL of 25 kn/m.Design a suitable I section using plastic theory,Assuming yield stress in steel as Fy = 250 N/mm^2	BT2	Understand
13.	A beam fixed at both ends is subjected to three concentrated loads 'W', each at one forth points of the span. Determine the collapse load for the beam in terms of its Mp.	BT2	Understand
14.	A three span continuous beam ABCD has the span lengths of AB= BC= CD=8m and carries an udl of 40kN/m completely covering the spans and A & D are simply supported ends. If the load factor is 1.5 and Shape factor is 1.15 for the "T" section. Find the section modulus needed. Assume the yield stress for the material as 300N/mm^2.	**BT4**	Analyze

Q.No	PART-C	BT Level	Competence
1	Analyze a propped cantilever of length L and subjected to a uniformly distributed load of w/m length of entire span and also find the collapse load.	**BT4**	Analyze
2	A beam of rectangular cross- section B x D is subjected to a bending moment of 0.8 Mp. Find out the depth of elastic core.	BT5	Evaluate
3	A Rectangle portal frame of span L and height L/2 is fixed to the section through with its fully plastic moment of resistance equal to My. It is loaded with point load W at the centre of span as well as a horizontal force W/2 at its top right corner. Calculate the value of W at the collapse of the frame	BT6	Create
4	Derive the shape factor for I section and circular section	BT4	Analyze

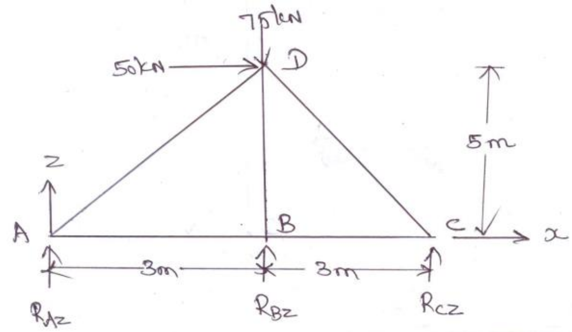
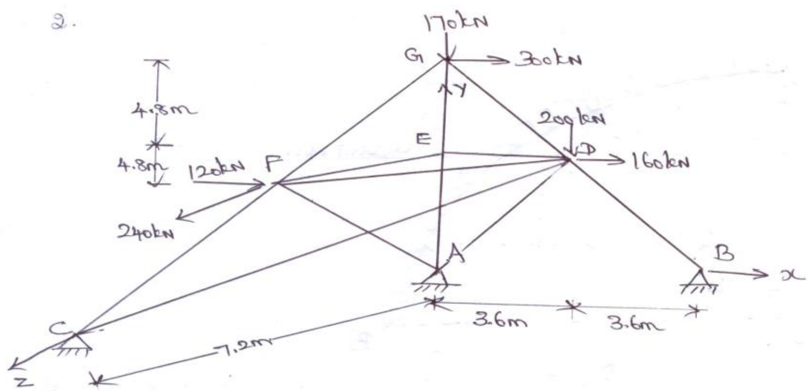
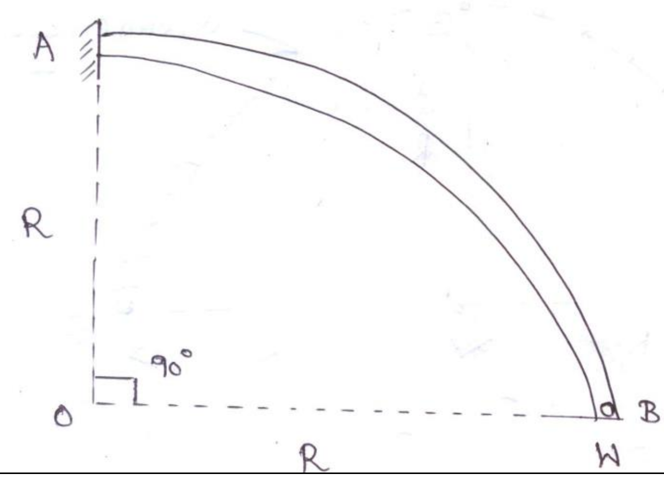
UNIT V- CABLE AND SPACE STRUCTURES

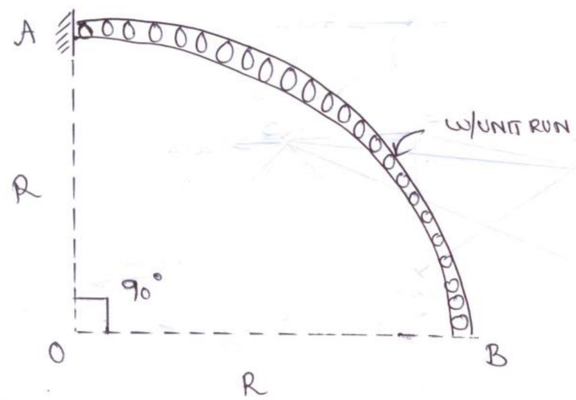
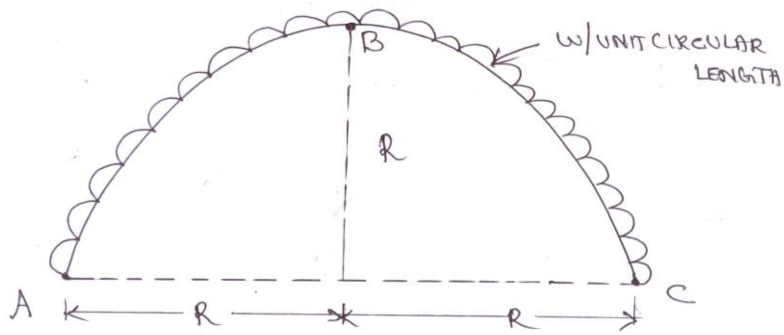
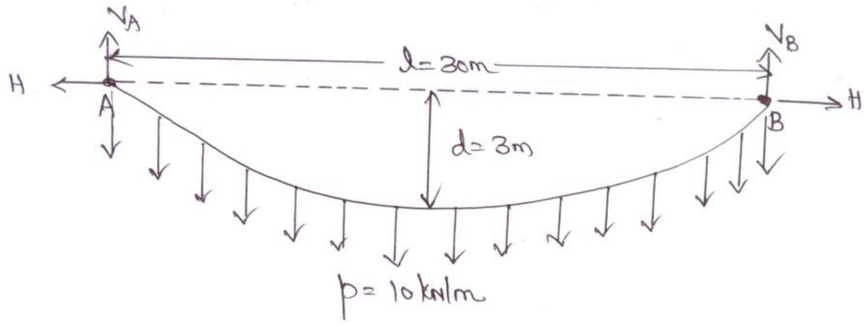
SYLLABUS

Analysis of Space trusses using method of tension coefficients – Beams curved in plan Suspension cables – suspension bridges with two and three hinged stiffening girders

Q.No	PART-A	BT Level	Competence
1	Describe cable structures. Mention its needs	BT1	Remember
2	Examine the true shape of cable structures.	BT1	Remember
3	Demonstrate the nature of force in the cables.	BT3	Application
4	Describe catenary	BT2	Understand
5	List out the different types of cable structures.	BT1	Remember
6	Explain cable over a guide pulley.	BT4	Analyze
7	Explain cable over asaddle.	BT4	Analyze
8	List out the main functions of stiffening girders in suspension bridges.	BT1	Remember
9	Calculate the degree of indeterminacy of a suspension bridge with two hinged stiffening girder.	BT3	Application
10	Differentiate curved beams and beams curved in plan	BT2	Understand
11	Differentiate between plane truss and space truss.	BT2	Understand
12	Define tension coefficient of a truss member.	BT1	Remember
13	Summarize about curved beams.	BT6	Create
14	Assess the forces developed in beams curved in plan	BT6	Create
15	Analyse the significant features of circular beams on equally spaced supports.	BT4	Analyze
16	Analyse the expression for calculating equivalent UDL on a girder.	BT4	Analyze
17	Describe the range of central dip of a cable.	BT1	Remember
18	Compose the expression for determining the tension in the cable.	BT5	Evaluate
19	Compose the types of significant cable structures.	BT5	Evaluate
20	Compose the methods available for the analysis of space truss.	BT5	Evaluate

Q.No	PART – B	BT Level	Competence
1.	Using the method of tension coefficients, Analyse the space truss shown in the figure and find the forces in the members of the truss.	**BT4**	Analyze

			
2.	Analyse the space truss shown in the figure by the method of tension coefficients and determine the member forces. 	**BT4**	Analyze
3.	A curved beam in the form of a quadrant of a circle of radius R and having a uniform cross section is in a horizontal plane.It is fixed at A and free at B as shown in the figure. It carries a vertical concentrated load W at the free end Computethe shear force, bending moment and twisting moment values and sketch variations of the above quantities.Also determine the vertical deflection of the free end B. 	**BT3**	Application
4.	A curved beam AB of uniform cross section is horizontal in plan and in the form of a quadrant of a circle of radius R .The beam is fixed at A and free at B. It carries a uniformly distributed load of w/unit run over the entire length of the beam as shown. Calculate the shear forces, bending moment and Twisting moment value,at A and B and sketch the variations of the same. Also determine the deflection at the free end B.	**BT3**	

			
5.	Diagram shows a curved beam, semi-circular in plan and supported on three equally spaced supports. The beam carries a uniformly distributed load of w/unit of the circular length. Analyse the beam and sketch the bending moment and twisting moment diagrams. 	**BT4**	Analyze
6.	A suspension cable having supports at the same level,has a span of 30m and a maximum dip of 3m.The cable is loaded with a udl of 10kN/m throughout its length. Evaluate the maximum tension in the cable. 	**BT5**	Evaluate
7.	A suspension bridge of 250m span has two nos of three hinged stiffening girdness supported by cables with a central dip of 25m.If 4 point load of 300kN each are placed at the centre line of the roadway at 20,30,40 and 50m from the left hand hinge, Estimate the shear force and bending moment in each girder at 62.5m from each end. Estimate also the maximum tension in the cable.	**BT2**	Understand

8.	A suspension cable is supported at 2 points 25m apart .The left support is 2.5m above the right support.The cable is loaded with a uniformly distributed load of 10kN/m throughout the span.The maximum dip in the cable from the left support is 4m. Quote the maximum and minimum tensions in the cable	**BT1**	Remember
9.	A suspension cable of 75m horizontal span and central dip 6m has a stiffening girder hinged at both ends. The dead load transmitted to the cable including its own weight is 1500kN.The girder carries a live load of 30kN/m uniformly distributed over the left half of the span.Assuming the girder to be rigid, Assess the shear force and bending moment in the girder at 20m from the left support. Also assess the maximum tension in the cable.	**BT6**	Create
10.	A suspensioncable has a span of 120m and a central dip of10m is suspended from the same level at both towers.The bridge is stiffened by a stiffening girder hinged at the end supports.The girder carries a single concentrated load of 100kN at a point 30m from left end.Assuming equal tension in the suspension hangers. i)the horizontal tension in the cable ii)the maximum positive bending moment.	**BT6**	Create
11.	A suspension cable of span 100m is subjected at the same level. It is subjected to a udl of 28.5kN/m. If the maximum tension in the cable is limited to 4000kN. Calculate the minimum central dip needed.	**BT5**	Evaluate
12.	A suspension bridge is of 200m span. The cable of the bridge has a dip of 15m. The cable is stiffened by a three hinged girder with hinges at either ends and at centre. The dead load of the girder is 15kN/m find the greatest positive and negative bending moment in the girder when a concentrated load of 340kN passes through it. Also find the maximum tension in the cable.	**BT5**	Evaluate
13.	If the central dip is limited to 1/12 th span. Find the maximum horizontal span which steel wire of uniform cross section may have with the stress not exceeding 120N/mm^2. Take the unit weight of steel as 78kN/m^2.	**BT3**	Application
14.	A suspension cable is supported at 2 points 30m apart .The left support is 3m above the right support.The cable is loaded with a uniformly distributed load of 40kN/m throughout the span.The maximum dip in the cable from the left support is 5m. Quote the maximum and minimum tensions in the cable	**BT1**	Remember

Q.No	PART – C	BT Level	Competence
1.	A suspension cable, having supports at the same level, has a span of 45 m and the maximum dip is 4m. The cable is loaded with the udl of 15 kN/m run over the whole span and two point loads 35kN each at middle third points. Find the maximum tension in the cable. Also calculate the length of cable required.	**BT5**	Evaluate
2.	Athree hinged stiffening girder of a suspension bridge of 100 m span subjected to two point loads 10 kN each placed at 20 m and 40 m, respectively from the left hand hinge. Determine the bending moment and shear force in the girder at section 30 m from each end. Also determine the	**BT-3**	Remembering

	maximum tension in the cable which has a central dip of 10 m.		
3.	A suspension bridge has a span 50 m with a 15 m runway. It is subjected to a load of 30 kN/m including self-weight. The bridge is supported by a pair of cables having a central dip of 4m, Find the cross sectional area of the cable necessary if the maximum permissible stress in the cable material is not to exceed 600 Mpa.	**BT-1**	Remembering
4.	A semicircular beam of radius R in plan is subjected to UDL and simply supported by three columns spaced equally. Derive the expression for bending moment and torsional moment at x-be a point on the beam making an angle a' with axis passing through the base of the circle.	**BT-2**	Understanding

VALLIAMMAI ENGINEERING COLLEGE

DEPARTMENT OF CIVIL ENGINEERING

CE6602-STRUCTURAL ANALYSIS II

QUESTION BANK

S.no	Unit		BT1	BT2	BT3	BT4	BT5	BT6	Total Question
1	Unit-1	Part-A	6	4	3	3	2	2	20
		Part-B	3	3	1	4	1	2	14
		Part-C	2	2	-	-	-	-	4
2	Unit-2	Part-A	6	4	3	3	2	2	20
		Part-B	4	3	1	3	1	2	14
		Part-C	-	1	1	1	-	1	4
3	Unit-3	Part-A	6	3	2	4	3	2	20
		Part-B	4	4	3	1	1	1	14
		Part-C	2	1	1	-	-	-	4
4	Unit-4	Part-A	6	3	2	4	3	2	20
		Part-B	2	3	2	3	3	1	14
		Part-C	-	-	-	2	1	1	4
5	Unit-5	Part-A	6	3	2	4	3	2	20
		Part-B	2	1	3	3	3	2	14
		Part-C	1	1	1		1		4
Cumulative		Part-A	30	17	12	18	13	10	100
		Part-B	15	14	10	14	9	8	70
		Part-C	5	5	3	3	2	2	20

TOTAL NO.OF QUESTIONS IN EACH PART

PART A	**100**
PART B	**70**
PART C	**20**
TOTAL	**190**

Dr.A.Leema Rose Mr.C.Arumugam Mr.Karthick S