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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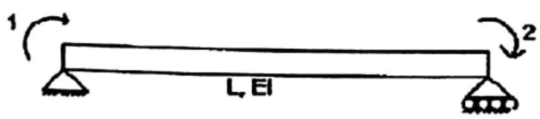
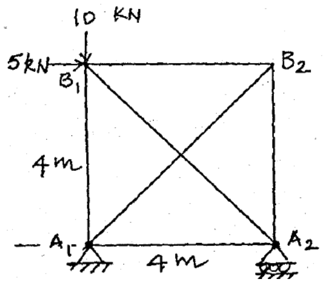
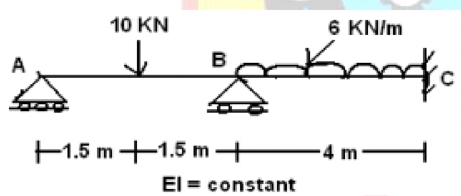
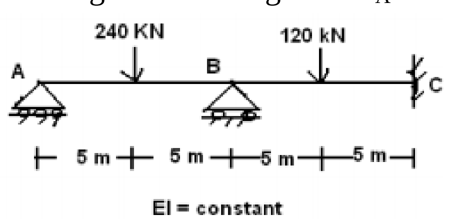
SUBJECT : CE6602 -STRUCTURAL ANALYSIS II

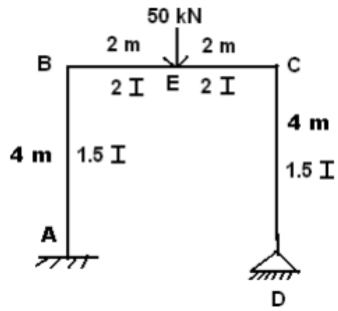
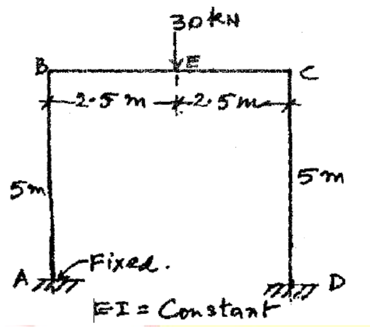
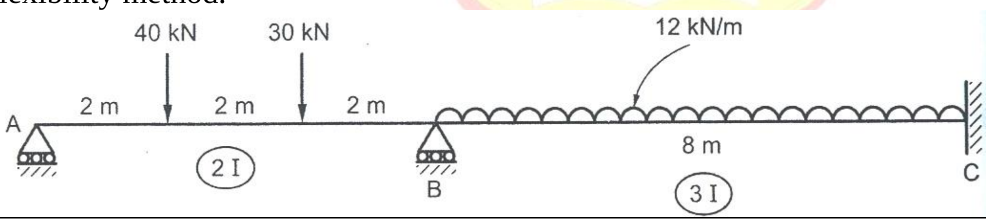
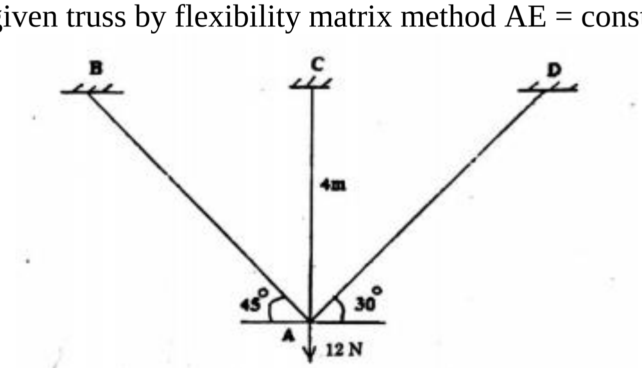
SEM / YEAR: VI/III

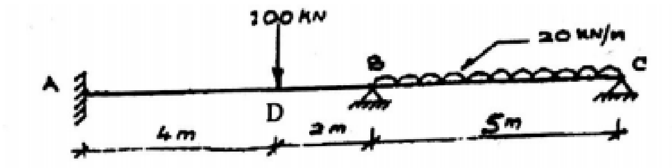
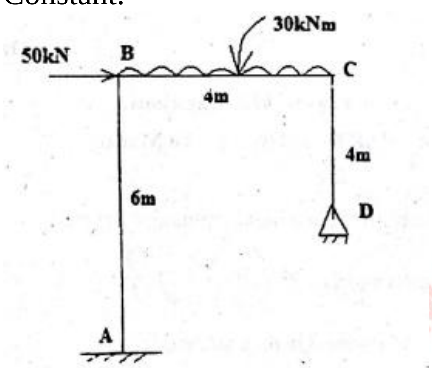
UNIT I - FLEXIBILITY METHOD

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 do you mean by static and kinematic indeterminacy?	BT1	Remember
2.	Write down the flexibility matrix for a simply supported beam with reference to coordinates shown in fig. 	BT5	Evaluate
3.	Write the general expression for the degree of static indeterminacy of pin 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.	Find the degree of indeterminacy of propped cantilever beam.	BT1	Remember
6.	Define Flexibility of a structure.	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 Force Transformation Matrix	BT4	Analyze

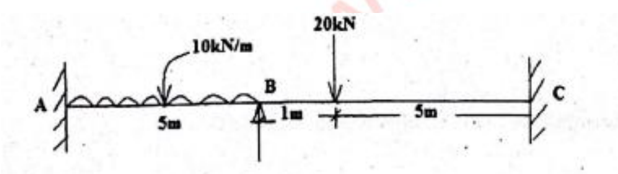
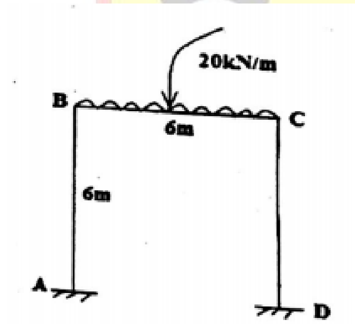
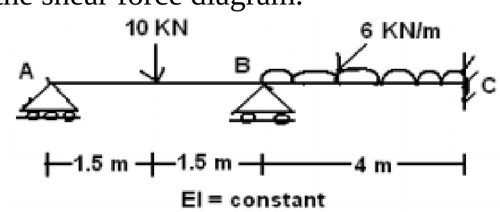
Q.No	PART - B	BT Level	Competence
1.	Analyse the pin-jointed plane frame shown in Fig below by flexibility matrix method. The flexibility for each member is 0.0025 mm/KN.  	BT4	Analyze
2.	A two span continuous beam ABC is fixed at A and hinged at supports B and C, Span of AB=Span of BC= 13m. Set up flexibility influence co-efficient matrix assuming vertical reaction at B and C as redundant.	BT4	Analyze
3.	A cantilever of length 20m is subjected to a single concentrated load of 45kN at the middle of the span. Find the deflection at the free end using flexibility matrix method. EI is uniform throughout.	BT5	Evaluate
4.	A two span continuous beam ABC 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.	BT3	Application
5.	Calculate the deflection and moments of continuous beam shown in Fig below using force method.  	BT1	Remember
6.	A cantilever is subjected to a single concentrated load P at the middle of the span. Calculate the deflection at the free end using flexibility matrix method. EI is uniform throughout.	BT1	Remember
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 hinged 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 flexibility matrix method.	BT1	Remember

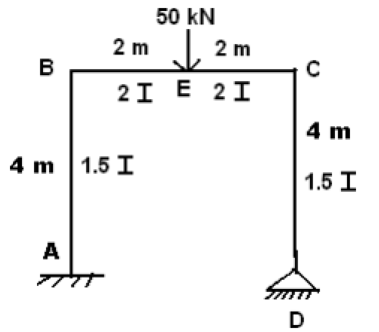
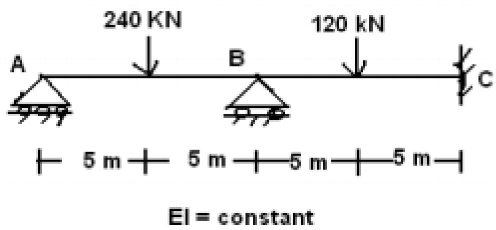
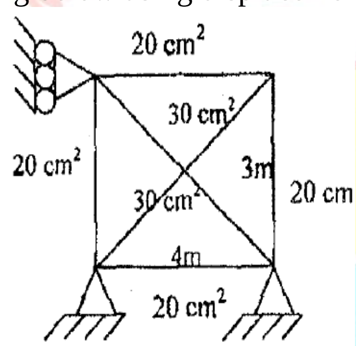
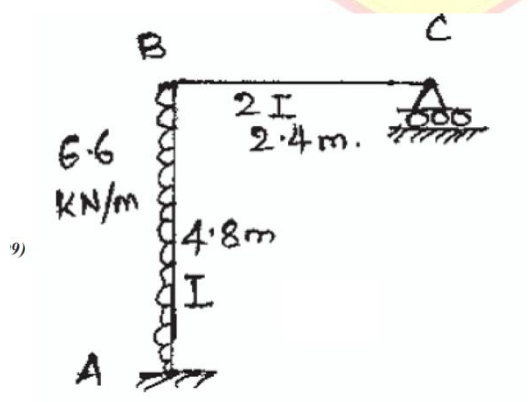
9.	Solve the portal frame ABCD shown in Fig below by flexibility matrix method and sketch the bending moment diagram. 	BT2	Understand
10.	Solve the portal frame ABCD shown in Fig below by flexibility matrix method and sketch the bending moment diagram. 	BT3	Application
11.	A portal frame ABCD with supports A and D are hinged 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 flexibility matrix method.	BT4	Analyze
12.	Examine the moment of the continuous beam shown in Fig below by flexibility method. 	BT1	Remember
13.	Analyze the given truss by flexibility matrix 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

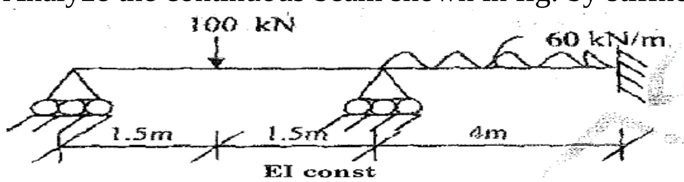
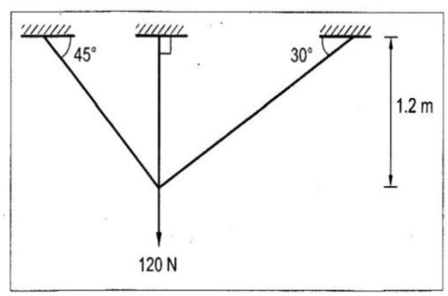
Q.No	PART - C	BT Level	Competence
1.	Analyse the given beam by flexibility matrix method. EI constant throughout the section. 	BT1	Remember
2.	Analyze the frame shown in figure by flexibility matrix method. Take EI Constant. 	BT2	Understand
3.	A two span continuous beam ABC is fixed at A and hinged at 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 hinged 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

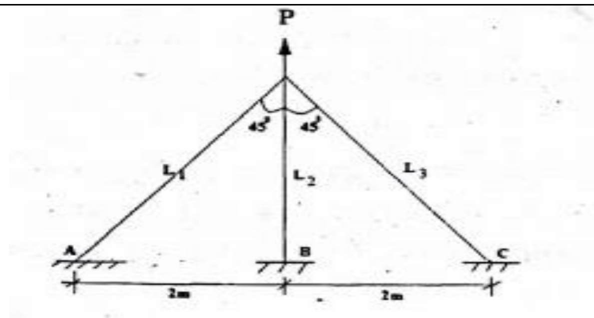
UNIT II - STIFFNESS MATRIX METHOD			
Element and global stiffness matrices – Analysis of continuous beams – Co-ordinate transformations – Rotation matrix – Transformations of **stiffness matrices,** load vectors and displacements vectors – Analysis of pin-jointed plane frames and rigid frames (with redundancy 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.	Write down the element stiffness matrix for 2D plane element.	BT1	Remember
4.	Write the relationship between flexibility and stiffness matrix.	BT3	Application
5.	Define Local and Global coordinates.	BT1	Remember
6.	Define Kinematic redundancy.	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.	Explain the 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.	Compare flexibility and stiffness matrix.	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.	Define Transformation matrix.	BT2	Understand

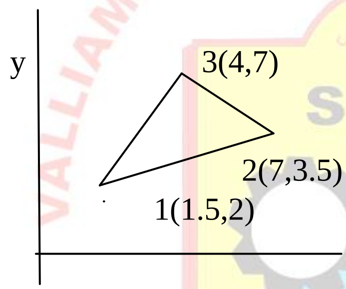
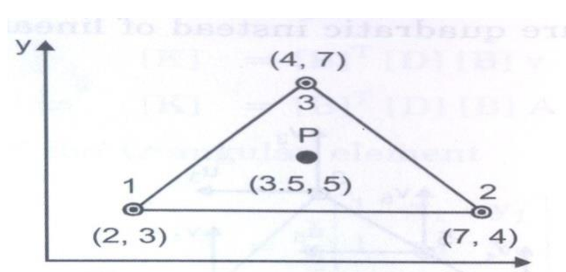
Q.No	PART-B	BT Level	Competence
1.	Analyse the continuous beam shown in figure by stiffness method and also sketch the bending moment's diagram. 	BT4	Analyze
2.	Analyse the given frame by stiffness method and also sketch the bending moment diagram. 	BT1	Remember
3.	Examine the continuous beam ABC shown 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

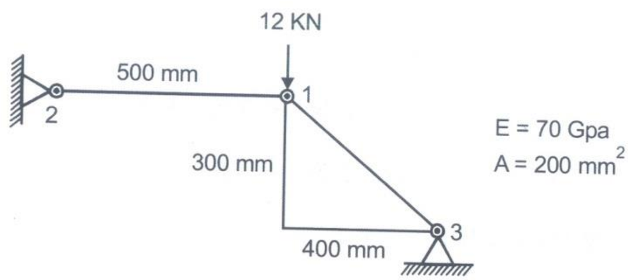
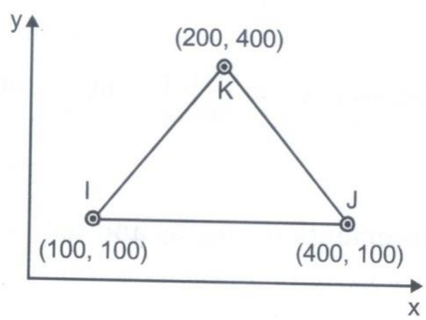
			
5.	Compute the final forces of continuous beam shown in Fig below using displacement method. 	BT5	Evaluate
6.	Analyse the truss shown in Fig below using displacement method. 	BT4	Analyze
7.	Solve the portal frame shown in Fig below by matrix stiffness method and sketch the SFD and BMD. Given El is constant. 	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. Estimate BM by 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.	Explain the steps involved in the analysis of pin jointed plane frames using matrix stiffness 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.	Analyze the given frame shown in fig. by Stiffness matrix method. AE is equal to unity.	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

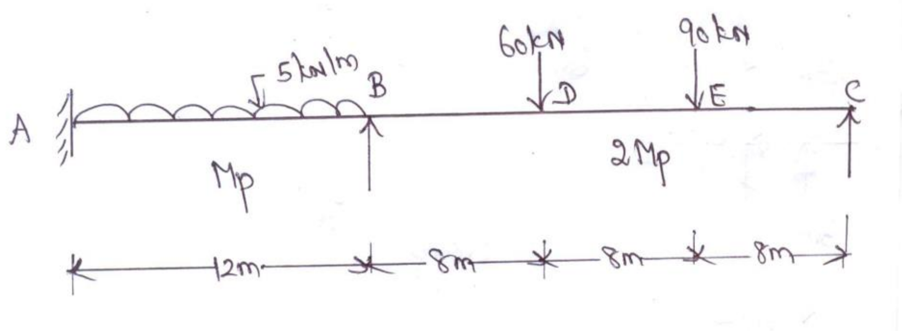
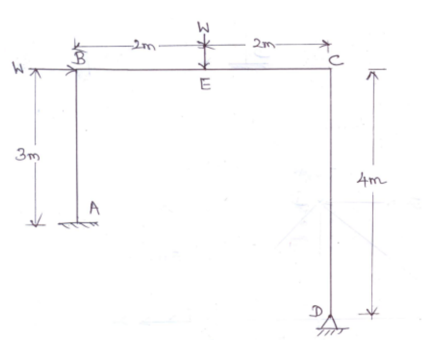
UNIT III - FINITE ELEMENT METHOD			
SYLLABUS Introduction – Discretisation of a structure – Displacement functions – Truss element – Beam element – Plane stress and plane strain - Triangular elements			
Q.No	**PART-A**	**BT Level**	**Competence**
1.	What is the basic concept of finite element analysis?	**BT-2**	**understand**
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.	What is shape function?	**BT-1**	**Remember**
7.	Explain ‘discretization’?	**BT-6**	**Creating**
8.	What are the advantages of FEA?	**BT-6**	**Creating**
9.	Explain body force and surface force with examples.	**BT-2**	**understand**
10.	Classify the elements used in FEM?	**BT5**	**Evaluate**
11.	Show the possible locations for nodes in a triangular element.	**BT2**	**Understand**
12.	Discuss the steps involved in finite element modeling.	**BT-2**	**understand**
13.	Examine the properties of stiffness matrix?	**BT-4**	**Analyze**
14.	Write the natural co-ordinates for the point P of the triangular element. The point P is the C.G of the triangle.	**BT-1**	**Remember**
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**

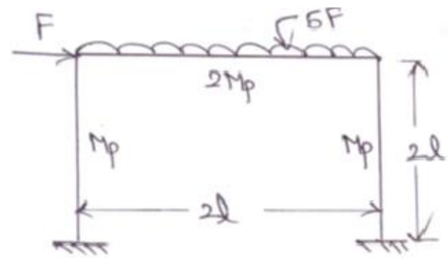
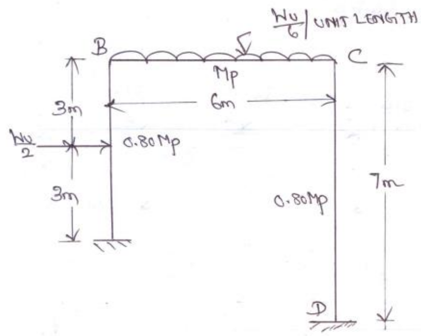
19.	What are the properties of shape functions?	**BT-1**	**Remember**
20.	Explain natural coordinates?	**BT-6**	**Creating**
	PART – B		
1.	List and briefly describe the general steps of finite element method.	BT-1	**Remember**
2.	Derive the Shape Function for a one dimensional linear bar element	**BT1**	Remember
3.	What are the different types of element used in FEM?	**BT1**	Remember
4.	Explain the term: i) Plane stress analysis ii) Plan strain analysis	BT-3	**Application**
5.	Derive the Shape Function for a two noded bar element	**BT2**	Understand
6.	Derive shape functions and stiffness matrix for a 2D rectangular element.	BT-3	**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.	What are generalized coordinates and natural coordinates.	**BT4**	Analyze
9.	State the requirements of shape function for convergence.	**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. Take t=20 mm and E=2x10^5MPa 	**BT3**	Application
13.	Derive the expression for stress-strain relationship matrix for 2D element.	BT-1	**Remember**
14.	a)Describe the historical background of FEM b)Explain the relevance of FEA for solving design problems with the aid of examples	BT-6	**Creating**

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 Shape factor and load factor	BT1	Remember
10.	Compose upper bound theory	BT5	Evaluate
11.	Discuss lower bound theory.	BT2	Understand
12.	State plastic moment of resistance.	BT3	Application
13.	Classify the types of frames.	BT4	Analyze
14.	Explain about symmetric frames and how are they analyzed.	BT4	Analyze
15.	Derive the shape factor for the rectangular section of base "B" and depth "D".	BT4	Analyze
16.	Describe plastic modulus of a section.	BT2	Understand
17.	Write the section having minimum shape factor.	BT6	Create
18.	Formulate the governing equation for bending.	BT6	Create
19.	Explain briefly about pure bending.	BT2	Understand
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'.	**BT1**	Remember
2.	show 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'.	**BT2**	Understand
3.	A mild steel I-section 200mm wide and 450mm 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=415N/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 flange dimensions 100mm X 10 mm and web dimensions 90mm X10 mm.	**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.  Fig 4.1	**BT1**	Remember
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.	BT3	Application
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.	**BT4**	Analyze

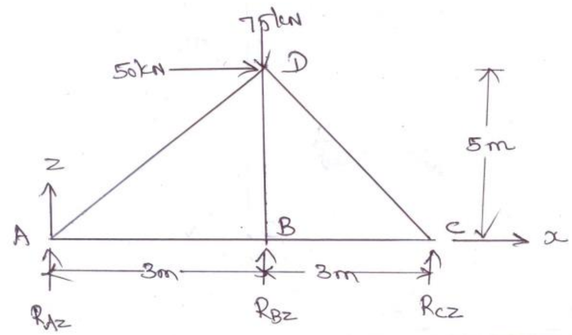
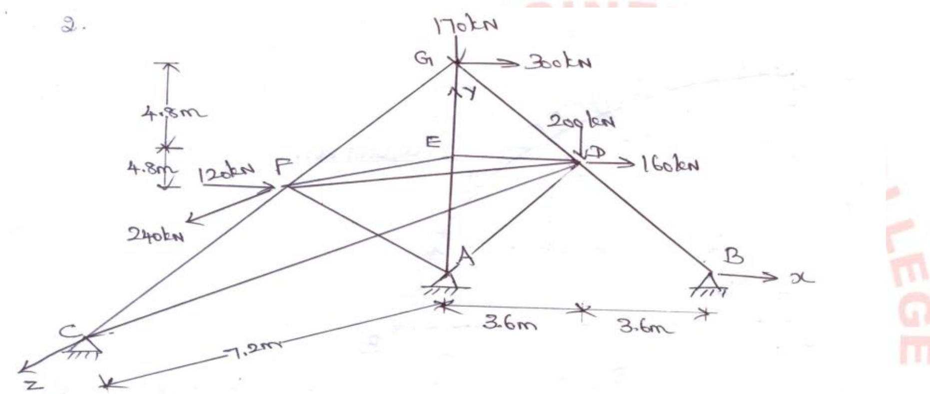
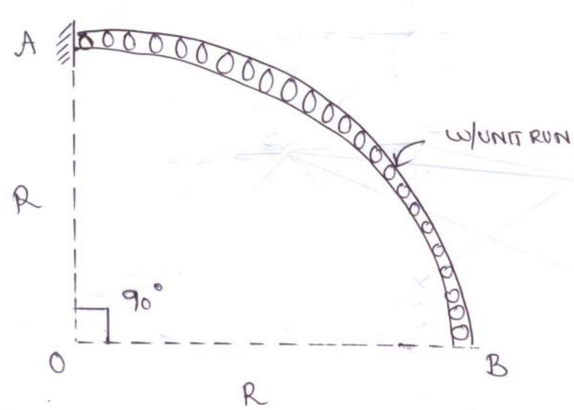
	 **Fig 4.3**		
10.	Assess the collapse load for the loaded frame loaded as shown in the Fig 4.4  **Fig 4.4**	**BT6**	Create
11.	A fixed beam of span 'l' carries a uniformly distributed load 'w' on the right half portion. Find the value of collapse load $W_{c.}$ The beam is of uniform moment of resistance.	BT3	Application
12.	A propped cantilever beam of length "L" carries a UDL of w/m over the entire length. Find the collapse load.	**BT1**	Remember
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=20 m and carries an udl of 100kN/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 250 N/mm^2.	**BT4**	Analyze

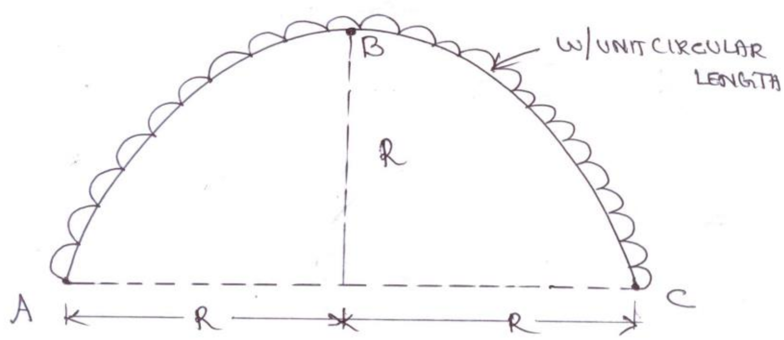
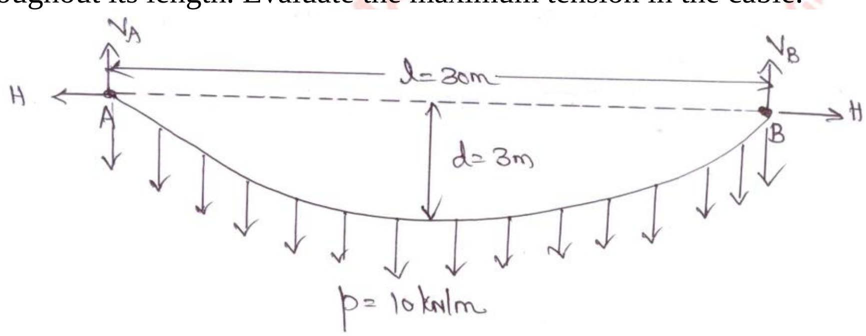
Q.No	PART-C	BT Level	Competence
1	Analyze a propped cantilever of length L and subjected to a uniformly distributed load of w/m length of entire span and also find the collapse load.	**BT4**	Analyze
2	A beam of rectangular cross- section B x D is subjected to a bending moment of 0.8 Mp. Find out the depth of elastic core.	BT5	Evaluate

3	A Two span continuous beam of section is fixed at A and hinged at B and C. Span AB is 8m and BC is 6m long. Two point loads of 50KN each are acting on AB at 2m from A and B. Span BC is loaded with UDL of intensity 10KN/m. Determine the plastic moment.	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	Examine curved beams	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	Mention the components of forces acting on the beams curved in plan.	BT2	Understand
15	Give examples of beam curved in plan.	BT4	Analyze
16	Write the application of space trusses.	BT3	Application
17	Write the temperature effect on cable.	BT1	Remember
18	Compose the expression for determining the tension in the cable.	BT6	Create
19	Determine the types of significant cable structures.	BT5	Evaluate
20	Determine the methods available for the analysis of space truss.	BT5	Evaluate

Q.No	**PART – B**	**BT**	**Competence**

		Level	
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. 	**BT1**	Remember
2.	Analyse the space truss shown in the figure by the method of tension coefficients and determine the member forces. 	**BT4**	Analyze
3.	Derive the expression for bending moment and torsion for a semi-circular beam of radius R. The cross section of the material is circular with radius r.It is loaded with a load at the mid point of the semicircle.	**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. 	**BT6**	Understand

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. Analyze 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. 	**BT1**	Remember
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.	**BT1**	Remember
8.	A cable of span 100 m has its ends at heights 8m and 15 m above the lowest point of the cables. It carries a UDL of 10KN/m per horizontal run of the span. Determine the horizontal and vertical reactions at the supports. What is the length of the cable?	**BT1**	Remember
9.	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.	**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.	BT2	Understand
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.	BT2	Understand
12.	A suspension bridge has a span of 60m with a 15m wide runway. It is subjected to a load 35KN/m including self-weight. The bridge is supported by a pair of cables having a central dip of 6m.Find the cross sectional area of the cable necessary, if the maximum permissible stress in the cable material is not to exceed 650 MPa	**BT5**	Evaluate
13.	A Suspension bridge cable of span 80 m and central dip 8 m is suspended from the same level of two towers. The bridge cable is stiffened by a three hinged stiffening girder which carries a single concentrated load of 20 KN at a point of 30 m from one end. Sketch the SFD for the girder.	**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.	Explain the procedure involved in tension coefficient method for space trusses.	**BT5**	Remembering
2.	A three 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 maximum tension in the cable which has a central dip of 10 m.	**BT-3**	Evaluate
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**	Evaluate
4.	A semi circular 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