



## NARASIMHA REDDY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad

Accredited by NAAC with A Grade, Accredited by NBA

### CIVIL ENGINEERING

#### QUESTION BANK

**Course Title** :STRUCTURAL ANALYSIS -I

**Course Code** :CE3101PC

**Regulation** :NR20

**Course Objectives** The objective of the course is to

- Differentiate the statically determinate and indeterminate structures.
- To understand the nature of stresses developed in perfect frames and three hinged arches for various types of simple loads
- Analyse the statically indeterminate members such as fixed bars, continuous beams and for various types of loading.
- Understand the energy methods used to derive the equations to solve engineering problems
- Evaluate the Influence on a beam for different static & moving loading position

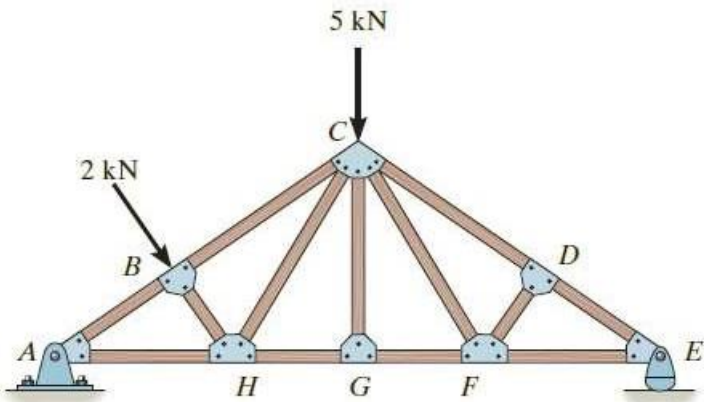
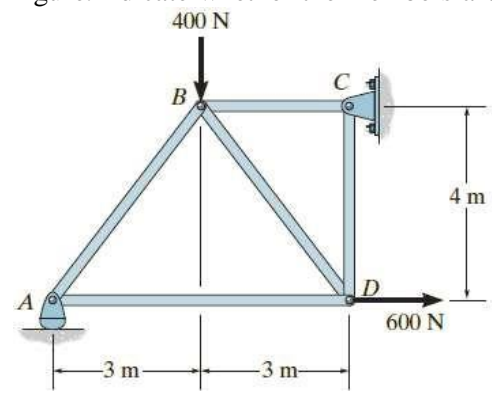
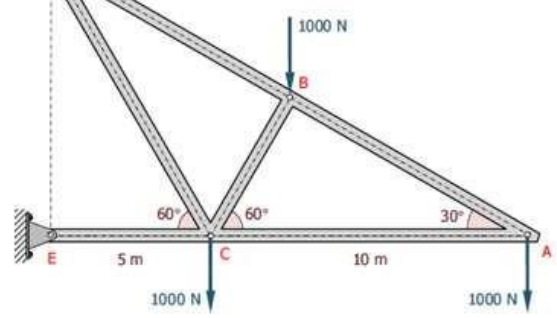
**Course Outcomes (CO's)** At the end of the course the student will able to

- An ability to apply knowledge of mathematics, science, and engineering
- Analyse the statically indeterminate bars and continuous beams
- Draw strength behaviour of members for static and dynamic loading.
- Calculate the stiffness parameters in beams and pin jointed trusses.
- Understand the indeterminacy aspects to consider for a total structural system.
- Identify, formulate, and solve engineering problems with real time loading

□ **UNIT-I**

□ **UNIT NAME**

S.No	Questions	BT	CO	PO
<b>Part – A (Short Answer Questions)</b>				
1	Define frame	L2	1	PO1 PO5
2	Write the short notes on method of sections	L2	1	PO1
3	Explain pin jointed frame.	L2	1	PO5
4	Write the short notes on method of joints	L2	1	PO1
5	Define castiglianos theorem	L1	1	PO5
6	Explain the types of supports	L2	1	PO1
7	What are advantages of method of sections	L2	1	PO5
8	What is DOF	L2	1	PO1
9	What is kinematic indeterminacy.	L1	1	PO5
10	Explain static indeterminate structure	L2	1	PO1
<b>Part – B (Long Answer Questions)</b>				

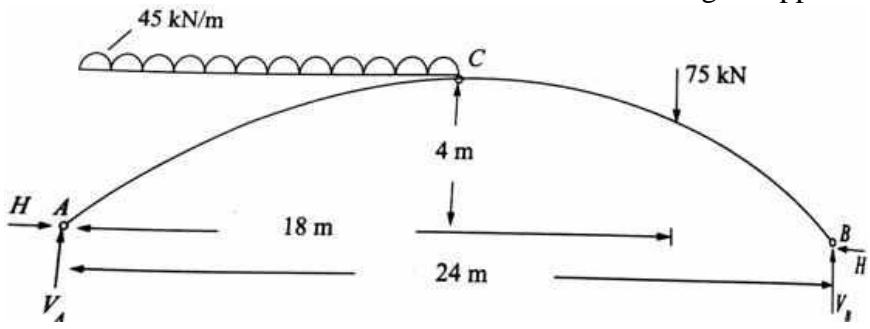
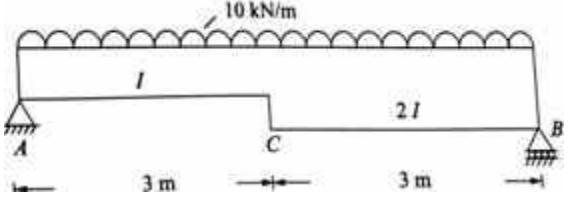
11	a)	 <p>Analyze using method of joints from fig.</p>	L4	1	PO4
12	a)	<p>Determine the force in each member of the truss shown in Figure. Indicate whether the members are in tension or compression.</p> 	L4	1	PO4
13	a)	Define castiglions theorems	L1	1	PO1
	b)	What are difference between determinate and inderterminat structures.	L2	1	PO5
14	a)	 <p>e cantilever truss in Figure is hinged at D and E. Find the force in each member.</p>	L4	1	PO4

15	a)	<p>Analyse the method of joints from fig .</p>	L4	1	PO4
16	a)	Write analysis procedure for method of joints	L2	1	PO1
	b)	Write analysis procedure for method of sections	L2	1	PO5

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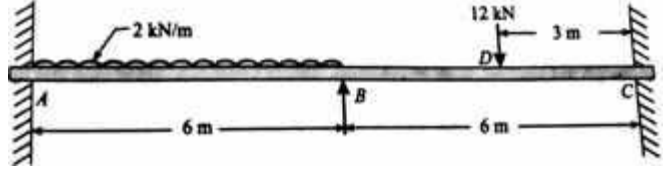
□ **UNIT-II**  
□ **UNIT NAME**

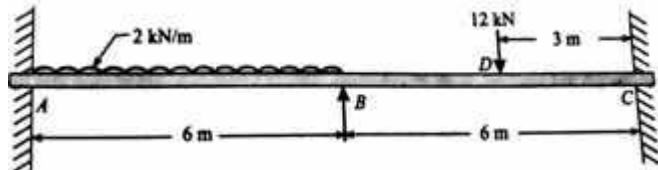
S.No	Questions	B T	C O	PO
<b>Part – A (Short Answer Questions)</b>				
1	Define strain energy	L2	2	PO1 PO5
2	List out types of arches	L2	2	PO1
3	Explain linear arch	L2	2	PO5
4	State the eddys theorem	L2	2	PO1
5	Explain tempertature effect on three hinged arch	L1	2	PO5
6	Write short notes on tie arch	L2	2	PO1
7	What are the advantages 3 hinged arch	L2	2	PO5
8	Write short note on rib shortening of three hinged arch	L2	2	PO1
9	What are difference between arch and beam	L1	2	PO5
10	Write short note on unit load method	L2	2	PO1
<b>Part – B (Long Answer Questions)</b>				
11	a) Analyze a steel beam of uniform cross-section is simply supported on a span of 10m and carries concentrated loads of 50,100 and 150KN at a distances of 2m,5m and 6m from the left supports. Compute the deflection under 150KN load using unit load method.	L4	2	PO4
12	a) Analyze a three hinge parabolic arch and determine the moment, normal rust and radial shear at a section 6m from the left support <div style="text-align: center;"> </div>	L4	2	PO4
13	a) Analyze a steel beam of uniform cross-section is simply supported on a span of 12m and carries concentrated loads of 50,100 and 150KN at a distances of 2m,6m and 6m from the left supports.	L4	2	PO4

		Compute the deflection under 140KN load using unit load method.			
14	a)	Analyze a three hinge parabolic arch and determine the moment, normal thrust and radial shear at a section 5m from the right support 	L4	2	PO4
15	a)	Derive expression for strain energy theorem.	L5	2	PO4
	b)	Explain linear arch	L2	2	PO4
16	a)	Analyze a simply supported beam with variable moment of inertia supports a uniformly distributed load of 14KN/m. Estimate the deflection at the center of the beam 	L4	2	PO4

□ **UNIT-III**

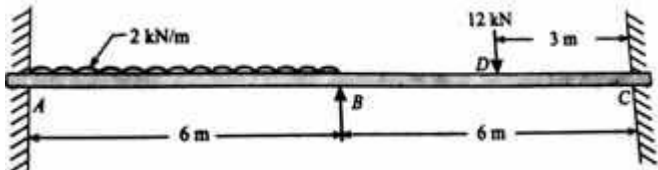
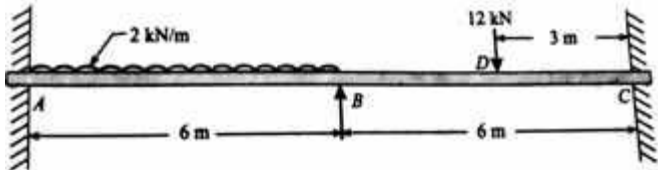
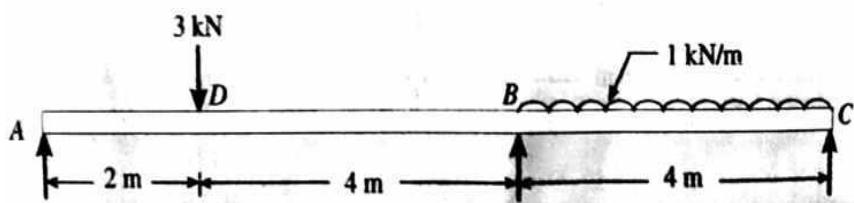
□ **UNIT NAME**

S.No	Questions	BT	CO	PO
<b>Part – A (Short Answer Questions)</b>				
1	Define prop reaction	L2	3	PO1 PO5
2	Explain advantages of fixed beam	L2	3	PO1
3	Write short note on propped cantilever beam	L2	3	PO5
4	Define degree of freedom	L2	3	PO1
5	What is KOI	L1	3	PO5
6	What are types of indeterminacy	L2	3	PO1
7	Explain analysis procedure for propped cantilever beam	L2	3	PO5
8	Write short note on fixed beam	L2	3	PO1
9	What is DOF for propped cantilever beam	L1	3	PO5
10	Explain the elastic curve of beams	L2	3	PO1
<b>Part – B (Long Answer Questions)</b>				
11	a)  Analyse from fig draw SFD and BMD	L4	3	PO4
12	a) propped cantilever beam of udl 10 kn/m over entire span is 5m.calculate prop reaction.Draw SFD and BMD	L4	3	PO4

13	a)		L4	3	PO4
Analyse from fig .Draw SFD and BMD					
14	a)	propped cantilever beam of udl 18 kn/m over entire span is 4m.calculate prop reaction.Draw SFD and BMD	L4	3	PO4
15	a)	propped cantilever beam of point load 15 kn span is 4m.calculate prop reaction.Draw SFD and BMD	L4	3	PO4
16	a)	propped cantilever beam of udl 20 kn/m over entire span is 4m.calculate prop reaction.Draw SFD and BMD	L4	3	PO4

□ **UNIT-IV**

□ **UNIT NAME**

S.No	Questions	B T	C O	PO	
<b>Part – A (Short Answer Questions)</b>					
1	What is single bay of frames	L2	4	PO1 PO5	
2	What is side sway of frames	L2	4	PO1	
3	Explain portal frames.	L2	4	PO5	
4	What is static indeterminacy of continuous beam	L2	4	PO1	
5	Write equation of three moment theorem	L1	4	PO5	
6	Explain advantages of continuous beam	L2	4	PO1	
7	What is static indeterminacy of pin jointed frame	L2	4	PO5	
8	Define sway frame	L2	4	PO1	
9	What is non sway frame	L1	4	PO5	
10	Write applications of continuous beam	L2	4	PO5	
<b>Part – B (Long Answer Questions)</b>					
11	a)		L4	4	PO4
Draw bending moment and shear force diagram of the beam shown in figure by using three moment theorem					
12	a)		L4	4	PO4
Draw bending moment and shear force diagram of the beam shown in figure by using slope deflection method					
13	a)		L4	4	PO4
Analyze a continuous beam ABC 10m long rest on three supports A,B and C at the same level and is loaded as shown in figure.using three moment theorem					

14	a)	<p>Analyze a continuous beam ABC 10m long rest on three supports A,B and C at the same level and is loaded as shown in figure.slope deflection method .</p>	L4	4	PO4
PO4	a)	Explain advantages of continuous beam	L2	4	PO5
15	b)	Explain analysis procedure for slope deflection method	L2	4	PO5
16	a)	Draw bending moment and shear force diagram of the beam shown in figure by using three moment theorem 	L4	4	PO4

□ UNIT-V

□ UNIT NAME

S.No	Questions	B T	C O	PO
<b>Part – A (Short Answer Questions)</b>				
1	Define influence line	L2	5	PO1 PO5
2	Write short note on muller Breslau principle	L2	5	PO1
3	What is absolute maximum shear force	L2	5	PO5
4	What is plane truss	L2	5	PO1
5	What are the difference of pratt and warren trusses	L1	5	PO5
6	Write short notes on focal length	L2	5	PO1
7	What is absolute maximum bending moment	L2	5	PO5
8	List out types of trusses	L2	5	PO1
9	Write short note on rolling load of beam	L1	5	PO5
10	Write influence line diagram	L2	5	PO5
<b>Part – B (Long Answer Questions)</b>				
11	a) Write short note on ILD	L2	5	PO4
	b) Write classification of trusses .	L2	5	PO4
12	a) Draw ILD for propped cantilever beam of span 6m.Draw SFD and BMD	L4	5	PO4
13	a)  Draw the influence line for reaction at A for the beam as shown in fig	L4	5	PO4
14	a)  Draw influence line for reaction at c for the beam as shown in fig.	L4	5	PO4
15	a) Write about Muller Breslau's principle	L2	5	PO4

	b)	Expain on focal length for beams	L5	5	PO4
16	a)	Draw ILD for propped cantilever beam of span 10m.Draw SFD and BMD	L4	5	PO4

\* **Blooms Taxonomy Level (BT)**(L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analyzing; L5 – Evaluating; L6 – Creating)

**Course Outcomes (CO)**

**Program Outcomes (PO)**

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**HOD, CE**