Code No: RT22016 **R13** SET - 1

II B. Tech II Semester Regular Examinations, April/May – 2016
STRUCTURAL ANALYSIS-I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) Differentiate between cantiver and propped cantilever. (2M)
   b) Draw the B.MD for a fixed beam carrying an eccentric load. (4M)
   c) Write the equations of the Clapeyron's theorem for different moments of inertia. (3M)
   d) A point load of 12kN is placed at a distance of 5.5M from a 7m long cantilever beam. If E=2.1x10^6N/cm^2 and I=50000cm^4, determine the slope at the free end. (5M)
   e) A cantilever beam of length L carries a point load W at the free end. Find the deflection at free end using energy theorem (4M)
   f) Draw I.L.D for the reaction at A for a simply supported beam AB. (4M)

PART -B

2. a) A cantilever AB of length 2M is fixed at end A and B rests at the centre of simply supported beam of span 4M.Find the support moment at A and deflection at B when the cantilever is loaded with uniformly distributed load of 20,000N/m EI for cantilever is 1 x 10^7 Nm^2 and EI for simply supported beam is 2 x$10^7$$Nm^2$ (12M)
   b) Write about moment area method (4M)

3. A fixed beam of length 12M carries two point loads at a distance of 4M and 8M from left end respectively. Find the fixed end moments under the loads when the beam is simply supported. Draw the B.M.D. (16M)

4. A continuous beam ABC of length 10M is simply supported ,AB and BC is of length 5M each. Span AB carries an udl of 4kN/m and BC carries an udl of 5kN/m.Support B sinks down by 5Mm below the supports of A and B.The moment of inertia of the beam is 10^8 mm^4 and E is 180kN/mm^2.Find the support moments and draw the B.M.D. (16M)

5. A Continuous beam is fixed at A and is supported over rollers at B and C. AB=BC=14M.The beam carries a uniformly distributed load of 40kN/m over AB and a point load of 260kN at a distance of 4M from B on span BC.B has an settlement of 25m.E= 2 x10^5 N/mm^2,I= 2 x 10^9 mm^4.Analyse the beam by slope deflection method. (16M)

6. a) Derive the strain energy equation due to bending moment. (6M)
   b) Analyze a continuous beam simply supported at A,B and C .The span AB and BC is 6M each. The two spans are carrying an udl of 32kN/m over entire span. Use Strain energy method Draw the B.M.D. (10M)

7. A uniform load of 2000N/m,5M long crosses a girder of 20m span from left to right.Calculate the maximum S.F and B.M at a section 8M from left support. (16M)
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Code No: RT22016 **R13** SET - 4

II B. Tech II Semester Regular Examinations, April/May – 2016
STRUCTURAL ANALYSIS-I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1.	a)	Differentiate between cantiver and propped cantilever.	(4M)
	b)	Draw the B.MD for a fixed beam carrying U.D.L throughout the span.	(4M)
	c)	State Clapeyron's three moment theorem	(4M)
	d)	A point load of 10kN is placed at a distance of 5M from a 7m long cantilever beam. If E=2.1x10^{6}N/cm^2 and I=50000cm^4, determine the deflection at the free end.	(4M)
	e)	A simply supported beam of length L carries an eccentric load W . Find the deflection using energy theorem	(3M)
	f)	Draw I.L.D for the reaction at B for a simply supported beam AB.	(3M)

PART -B

2.	a)	Find the support moment for the propped cantilever carrying uniformly varying load w/unit length from A to B. Draw B.M.D	(12M)
	b)	What are the steps involved in the analysis of propped cantilever.	(4M)
3.		Derive the equation with the effect of rotation on one end of a fixed beam.	(16M)
4		A continuous beam ABCD is simply supported over three spans. Span AB is 8M carrying an udl of 4kN/m, span BC is 12M carrying an udl of 3kN/m and span CD is 5M carrying an udl of 6kN/m. Find the moment over supports B and C.Draw B.M.D.	(16M)
5.		A Continuous beam is fixed at A and is supported over rollers at B and C. AB=BC=10M.The beam carries a uniformly distributed load of 20kN/m over AB and a point load of 200kN at a distance of 4M from B on span BC.B has an settlement of 20mm.E= 2 x10^5 N/mm^2,I= 2 x 10^9 mm^4.Analyse the beam by slope deflection method.	(16M)
6.	a)	Derive the strain energy equation due to axial loading.	(4M)
	b)	Analyze a continuous beam simply supported at A,B and C .The span AB and BC is 8M each. The two spans are carrying a load of udl of 30kN/m over entire span. Use Strain energy method Draw the B.M.D.	(12M)
7.		Draw the influence line diagrams for forces in the members of a Warren Truss	(16M)
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II B. Tech II Semester Regular Examinations, May/June - 2015
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(Civil Engineering)

Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What is the degree of indeterminacy of a propped cantilever?
   b) What are the support moments when there is relative displacement at the supports?
   c) How Clapeyron's theorem of three moments can be applied to a overhanging beams?
   d) What are the sign conventions used in slope deflection equations and write the equations.
   e) State the Castigliano's first theorem.
   f) Define the influence line. Draw a I.L.D.
   g) Differentiate between determinate and indeterminate structures.

(2M+2M+3M+4M+3M+4M+4M)

PART-B

2. a) Analyse the propped cantilever beam loaded as shown in the Figure 1.Draw the S.F.D and B.M.D. Assume EI constant throughout.

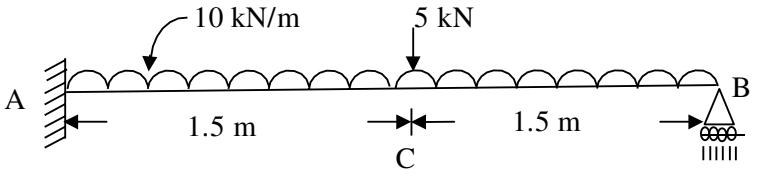

Figure 1

   b) A cantilever of length 4m carries a uniformly distributed load of 1kN/m length over the whole length .The free end of the cantilever is supported on a prop. If $E = 2 \times 10^5$ N/ mm^2 and $I = 10^8$ mm^4, then (i) find the prop reaction (ii) deflection at the centre of cantilever

(8M+8M)

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3. A continuous beam ABC is simply supported at A and C and continuous over support B with AB = 5m and BC = 6m.Auniformly distributed load of 12kN/m is acting over the beam. The moment of inertia is I throughout the span. Analyse the continuous beam and draw S.F.D and B.M.D. (16M)

4. Abeam ABCD 9.2m long is fixed at A and is supported at B and C at distances 4m and 7m from A with an overhang CD 2.2m long. The span AB carries a point load of 32kN at the mid span. A point load of 16kN acts at the end D. Find the moments and reactions at the supports. (16M)

5. ABC is a continuous beam with constant EI throughout its length. The end supports A and C are fixed and beam is continuous over middle support B. Span BC is uniformly loaded with 10kN per metre length ,while a concentrated vertical load of 100kN acts at the mid span AB. Calculate the moments by slope deflection method. (16M)

6. a) State and prove Castigliano's first theorem.
   b) Derive the energy stored due to axial loading. (8M+8M)

7. a) Draw the influence line diagram for a shear force at any section of a simply supported beam.
   b) Find the maximum force in the member shown in the Figure 2, when a uniformly distributed load of 10kN/m longer than the span crosses the bridge. (6M+10M)

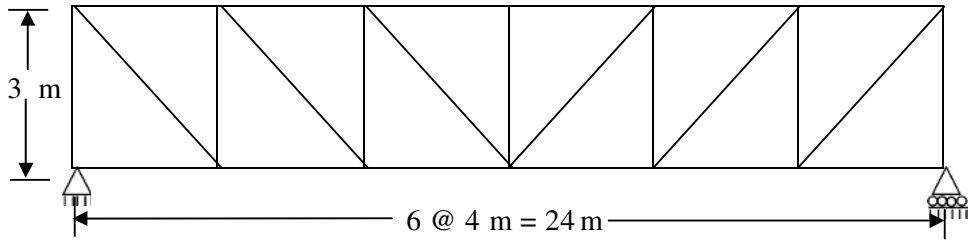

Figure 2

Code No: RT22016 **R13** SET - 2

II B. Tech II Semester Regular Examinations, May/June - 2015
STRUCTURAL ANALYSIS-I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Draw the bending moment diagram for a propped cantilever of length *l* with u.d.l. over the whole span.
   b) What is the equation for a fixed beam with ends at different levels?
   c) What is the procedure for analysing the continuous beams using theorem of three moments?
   d) What are the sign conventions used in slope deflection equations and write the equations.
   e) State the Castigliano's first theorem.
   f) Define the influence line. Draw I.L.D for a simply supported beam for finding the reactions at the supports. (3M+3M+4M+4M+3M+5M)

PART-B

2. a) Determine the reactions of the propped cantilever beam and draw SFD and BMD.

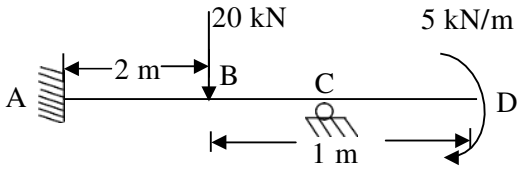

Figure 1

   b) A cantilever of length 6m carries a uniformly distributed load of 2kN/m length over the whole length. The free end of the cantilever is supported on a prop. If E = 2 x 10^5 N/ mm^2 and I = 10^8 mm^4, then (i) find the prop reaction (ii) deflection at the centre of cantilever (8M+8M)

3. A continuous beam ABC is simply supported at A and C and continuous over support B with AB = 4m and BC = 6m. A uniformly distributed load of 10kN/m is acting over the beam. The moment of inertia is I throughout the span. Analyse the continuous beam and draw S.F.D and B.M.D. (16M)

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4. Analyse the fixed beam shown in the Figure 2. (16M)

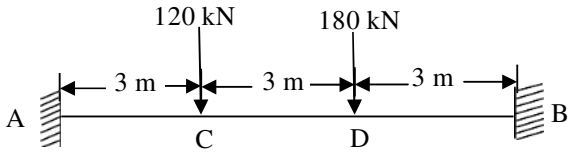

Figure 2

5. ABC is a continuous beam with constant EI throughout its length. The end supports A and C are fixed and beam is continuous over middle support B. Span BC is uniformly loaded with 12kN per metre length ,while a concentrated vertical load of 120kN acts at the mid span AB. Calculate the moments by slope deflection method. (16M)

6. a) State Castigliano's first theorem.

   b) Compute the vertical deflection of joint E by unit load method Figure 3. (4M+12M)

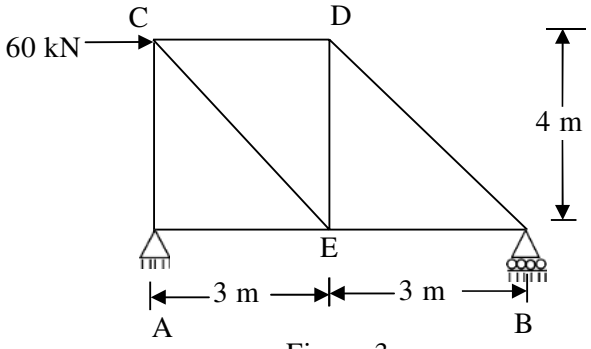

Figure 3

7. a) Draw the influence line diagram for a shear force at any section of a simply supported beam.

   b) A uniformly distributed load of 40kN/m and of length 3m transverse across the span of simply supported length of 18m.Compute the maximum bending moment at 4m from left support andabsolute bending moment. (6M+10M)

Code No: RT22016 **R13** SET - 3

II B. Tech II Semester Regular Examinations, May/June - 2015
STRUCTURAL ANALYSIS-I
(Civil Engineering)

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2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**
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PART-A

1. a) Name a method for deriving the compatibility equation for the propped cantilever.
   b) Draw the shear force and bending moment diagrams for a fixed beam when one of its supports sinks.
   c) What are the merits and limitations of the theorem of three moments?
   d) What are the sign conventions used in slope deflection equations and write the equations.
   e) State and prove Castigliano's first theorem.
   f) Draw a I.L.D for a simply supported beam for finding the reactions at the supports.

(3M+4M+3M+3M+6M+3M)

PART-B

2. a) A propped cantilever beam of length *l* is subjected to uniformly distributed load of ω/m length over three fourth of its span from the fixed support.Determine the prop reaction and sketch the BMD.
   b) A cantilever of length 5m carries a uniformly distributed load of 1kN/m length over the whole length. The free end of the cantilever is supported on a prop. If $E = 2 \times 10^5$ N/ mm^2 and $I = 10^8$ mm^4, then (i) find the prop reaction (ii) deflection at the centre of cantilever (iii) Magnitude and position of maximum deflection. (6M+10M)

3. A continuous beam ABC is simply supported at A and C and continuous over support B with AB = 7m and BC = 6m. A uniformly distributed load of 14kN/m is acting over the beam. The moment of inertia is I throughout the span. Analyse the continuous beam and draw S.F.D and B.M.D. (16M)
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4. Analyse the fixed beam shown in the Figure 1. (16M)

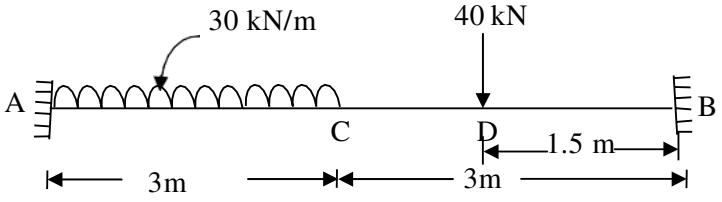

Figure 1

5. ABC is a continuous beam with constant EI throughout its length. The end supports A and C are fixed and beam is continuous over middle support B. Span BC is uniformly loaded with 14kN per metre length ,while a concentrated vertical load of 140kN acts at the mid span AB. Calculate the moments by slope deflection method. (16M)

6. a) State and prove Castigliano's first theorem.

   b) Compute the vertical deflection of joint E by unit load method Figure 2. (8M+8M)

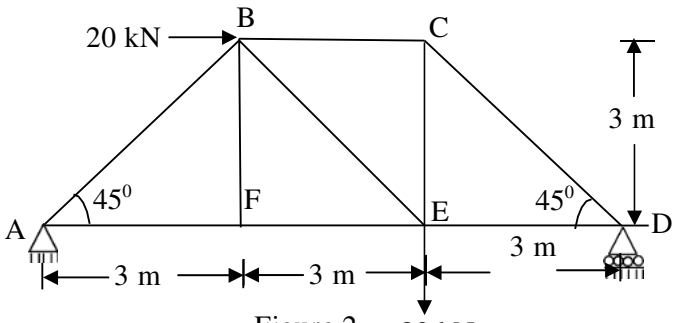

Figure 2

7. a) Draw the influence line diagram for a bending moment at any section of a simply supported beam.

   b) A uniformly distributed load of 50kN/m and of length 4m transverse across the span of simply supported length of 18m.Compute the maximum bending moment at 5m from left support andabsolute bending moment. (6M+10M)

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STRUCTURAL ANALYSIS-I
(Civil Engineering)

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2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) What is a propped cantilever? What is the degree of indeterminacy?
   b) Draw the shear force and bending moment diagrams for a propped cantilever when the prop sinks.
   c) State and deduce the Clapreyon's three-moment equation.
   d) What are the sign conventions used in slope deflection equations and write the equations.
   e) State and prove Castigliano's first theorem.
   f) Draw Influence line diagrams for a Pratt truss (4M+4M+3M+3M+3M+5M)

PART-B

2. a) A propped cantilever beam of length *l* is subjected to uniformly distributed load of ω/m length over three fourth of its span from the fixed support.Determine the prop reaction and sketch the BMD.
   b) A cantilever of length 7m carries a uniformly distributed load of 3kN/m length over the whole length. The free end of the cantilever is supported on a prop. If $E = 2 \times 10^5$ N/ mm^2 and $I = 10^8$ mm^4, then (i) find the prop reaction (ii) Magnitude and position of maximum deflection. (8M+8M)

3. A continuous beam ABC is simply supported at A and C and continuous over support B with AB = 7m and BC = 6m. A uniformly distributed load of 14kN/m is acting over the beam. The moment of inertia is I throughout the span. Analyse the continuous beam and draw S.F.D and B.M.D. (16M)
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4. A fixed beam AB of length 3m carries a point load of 45kN at a distance of 2m from A. If the flexural rigidity is of the beam is 1 x 10^4 kNm^2, determine (i) the fixed end moments at A and B. (ii) Deflection under the load and (iii) maximum deflection. (16M)

5. ABC is a continuous beam with constant EI throughout its length. The end supports A and C are fixed and beam is continuous over middle support B. Span BC is uniformly loaded with 8kN per metre length ,while a concentrated vertical load of 80kN acts at the mid span AB. Calculate the moments by slope deflection method. (16M)

6. a) State and prove Castigliano's first theorem.
   b) Compute the vertical deflection of joint E by unit load method Figure 1. (4M+12M)

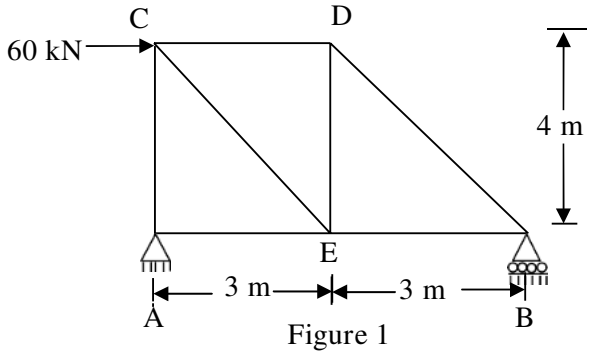

Figure 1

7. a) Draw the influence line diagram for a shearforce at any section of a simply supported beam.
   b) A uniformly distributed load of 60kN/m and of length 4m transverse across the span of simply supported length of 20m.Compute the maximum bending moment at 5m from left support andabsolute bending moment. (6M+10M)