Code No: R1622015 **R16** SET - 1

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
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 **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) Define prop and explain propped cantilever beam. (2M)
b) Explain the advantages of the fixed beam. (2M)
c) Compare statically determinate and statically indeterminate structure. (2M)
d) What are the assumptions made in slope-deflection method? (3M)
e) Write the application of unit load method. (2M)
f) When a series of wheel loads move along a girder, what is the condition for getting maximum bending moment under any one point load? (3M)

PART -B

2. A propped cantilever of span of 9m having the prop at the end is subjected to two concentrated loads of 24 kN and 48 kN at one third points respectively from left fixed end support. Calculate the maximum defelction and maximum slope also draw the shear force and bending moment diagram with salient points. (14M)

3. A fixed beam of span 4 m carries two point loads of 40kN and 60 kN at 1m and 2m from the left end respectively. Determine the (14M)
i) Fixed end moments
ii) Max. slope and Deflections
iii) Also draw BMD and SFD.

4. ABCD is a continuous beam having a span of 12 m. The left end A is fixed and simply supported at B and C. The portion CD is an overhang. The support A rotates by 0.008 rad and support B settles by 8 mm. Analyze the beam if the span AB = BC = CD = 4 m. (14M)

5. Analyze the continuous beam shown in Figure -1 by SDM. (14M)

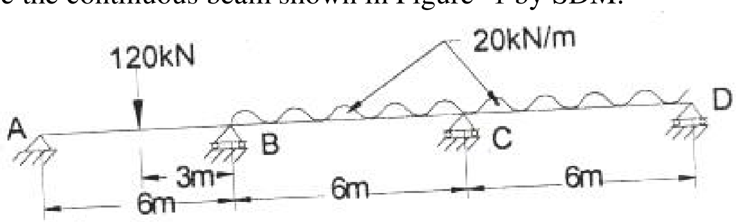

Figure -1

|''|''||''||''''|||||
~~~~~~

Code No: R1622015 **R16** SET - 1

6. Using Strain Energy theorem Calculate slope θ_A and θ_B and deflection at the center of a simple supported beam (AB) of span L carrying a clockwise couple M kN-m at the center of the beam and also draw BMD and SFD. (14M)

7. Define ILD and construct a ILD for shear force for a simply supported beam carrying a point load W. Explain how this generated ILD can be used for calculating shear and bending moment for a simply supported beam carrying u.d.l shorter than the span. (14M)

Code No: R1622015 **R16** SET - 2

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
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 **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) Define Compatability condition and Equilibrium condition. (2M)
   b) Explain the disadvantages of the fixed beam. (2M)
   c) Write the principle by which a continuous beam can be analyzed. (2M)
   d) What are the quantities in terms of which the unknown moments are expressed in slope deflection method? (3M)
   e) State the various methods for computing the joint deflection of perfect frame. (2M)
   f) Draw influence lines for support reactions in a simply supported beam. (3M)

PART -B

2. Analyze and draw S.F.D & B.M.D for a propped cantilever beam subjected to (14M)
   i) Point load of W kN at the center of the span L
   ii) Uniformly distributed load of w kN/m over entire span L

3. A fixed beam AB of span 10 m carries point load of 180 kN and clockwise moment of 160 kNm at distances 3 m and 6 m from left end respectively. If the left end support sinks by 15 mm, Examine the fixed end moments and reactions at the supports. Draw also SFD and BMD for the beam. Take EI = 6000 kN-m^2. (14M)

4. Analyze the continuous beam shown in Figure-1 by Three Moment Equation (14M)

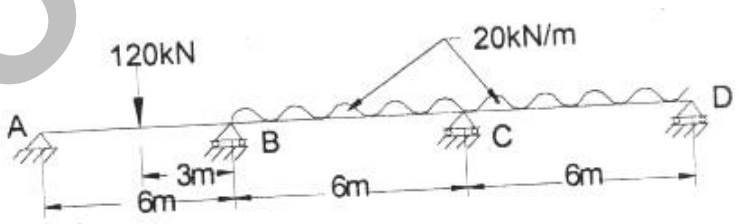

Figure-1
~~~~~~

Code No: R1622015 **R16** SET - 2

5. Analyze the continuous beam shown in Figure -2 by Slope Deflection Method (14M)

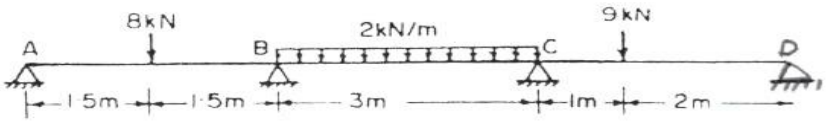

Figure -2

6. Calculate Horizontal deflection and Vertical deflection at point D in the Truss shown in figure -3 (14M)

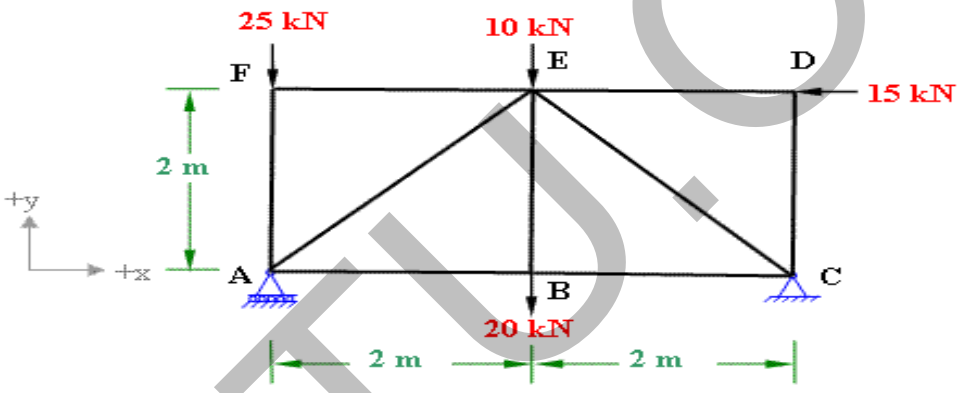

Figure -3

7. Two point loads of 500 kN and 300kN spaced at 6m apart cross a girder of 36m span from left to right with 400 kN leading. Construct the maximum shearing force and bending moment diagrams stating the absolute maximum values. (14M)

Code No: R1622015 **R16** SET - 3

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
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 **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) Explain the difference in the analysis of a propped cantilever beam from a cantilever beam. (3M)
   b) What are the Reactions in the supports, when there is relative displacement at the supports in a fixed beam? (3M)
   c) What is continuous beam and classify its types. (2M)
   d) Write the differences between Force and Displacement method of analysis. (2M)
   e) State and prove Castigliaon's first theorem. (2M)
   f) When a series of wheel loads move along a girder, what is the condition for getting maximum bending moment under any one point load? (2M)

PART -B

2. a) A propped cantilever of length 6 m is fixed at one end and supported on a rigid prop at other end. It carries a point load of 20 kN at a distance of 4 m from the fixed end. Find the prop reaction and point of contraflexure and draw the SFD and BMD. Assume prop sinks by 20 mm. E = 200 x 10^6 kN/m^2 and I=15x10^{-6} m^4 (7M)
   b) A propped cantilever of span 6 m is subjected to a UDL of 2 kN/m over a length of 4 m from the fixed end. Write the prop reaction and draw the SFD and BMD. (7M)

3. A fixed beam of span L m is subjected to anticlockwise couple M at the center of the beam, calculate the fixed end moments at the 2 ends Also calculate the maximum deflection and draw BMD and SFD. (14M)

4. Analyze the continuous beam shown in Figure-1 by Three Moment Equation (14M)

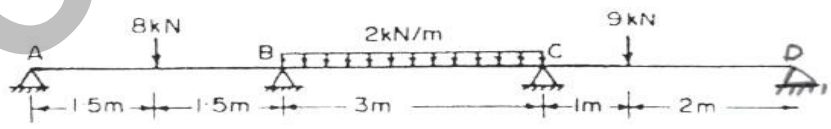

Figure -1

5. ABCD is a continuous beam having a span of 12 m. The left end A is fixed and simply supported at B and C. The portion CD is an overhang. The support A rotates by 0.008 rad and support B settles by 8 mm. Find the end moments using Slope Deflection Method. The span AB = BC = CD = 4 m (14M)
~~~~~~

Code No: R1622015 **R16** SET - 3

6. Calculate Horizontal deflection and Vertical deflection at point D in the Truss shown in figure -2 (14M)

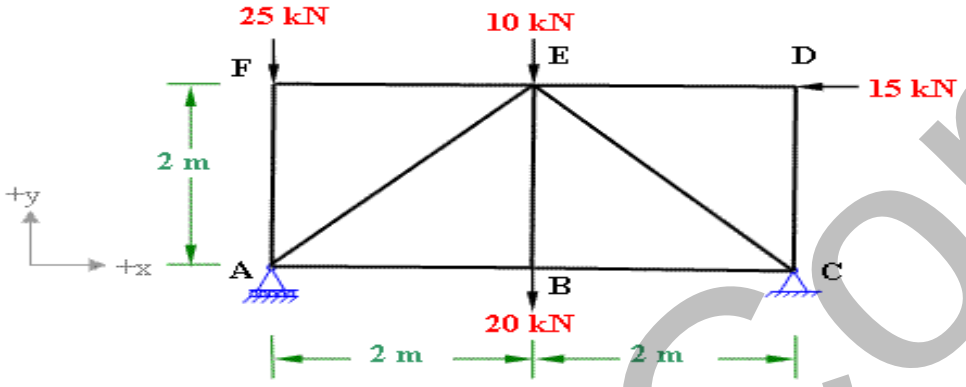

Figure -2

7. Uniformly distributed load of intensity 32 KN/M crosses a simply supported span of 60m from left to right. The length of the udl is 15m. Find the value of maximum S.F maximum B.M at a section of 18 m from left end. Find also the absolute value of maximum B.M of the S.F in the section. (14M)

|''|'''||''||'''||||

Code No: R1622015 **R16** SET - 4

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
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 **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) Compare statically determinate and statically indeterminate structure. (2M)
   b) How compatability condition is related to degree of static indeterminancy. (2M)
   c) How Clapeyron's theorem of three moments can be applied to analysis of a fixed beam. (3M)
   d) What is the limitation of slope-deflection equations applied in structural analysis? (2M)
   e) State Castigliaon's second theorem. (2M)
   f) When a series of wheel loads move along a girder, what is the condition for getting maximum bending moment under any one point load? (3M)

PART -B

2. Draw B.M.D and S.F.D for propped cantilever beam of span L subjected to u.d.l of w kN/m over entire span. Also derive the equations for calculating slope and deflection anywhere in the span of the beam and calculate the maximum deflection and its location. (14M)

3. A fixed beam of span L m is subjected to anti clockwise couple M at the center of the beam, calculate the fixed end moments at the 2 ends also calculate the maximum deflection and draw BMD and SFD. (14M)

4. Analyze A continuous beam ABCD is simply supported at A, B, C and D, AB = BC = CD = 5 m. Span AB carries a load of 30 kN at 2.5 m from A. Span BC carries an UDL of 20 kN/m. Span CD carries a load of 40 kN at 2 m from C. Draw SFD and BMD. (14M)

5. Analyze the continuous beam shown in Figure -1 by SDM (14M)

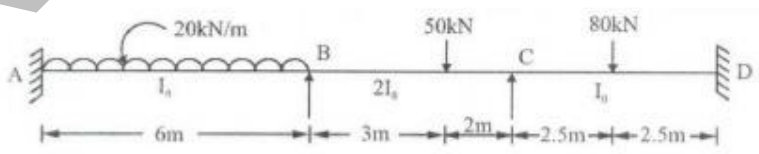

Figure -1
~~~~~~

INJNTU.COM

Code No: R1622015 **R16** SET - 4

6. Using Strain Energy theorem Calculate slope θ_A and θ_B and deflection at the center of a simple supported beam (AB) of span L carrying a clockwise couple M kN-m at the center of the beam and also draw BMD and SFD. (14M)

7. In the simply supported girder of span 16m, carries a uniformly distributed load of 2 KN/m, 6m long crosses a girder. Determine the maximum Shear force and Bending Moment and also calculate value at 5m and 8m from the left support. Draw SFD & BMD (14M)