PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST – 1

Even Semester: 2018-19

Course Code: CIV 205

Course Name: Structural Analysis - I

Programme & Sem: B.Tech (CIV) & IV Sem

Date: 05 March 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instruction:
- *(i) Read the question properly and answer accordingly.*
- *(ii) Question paper consists of 3 parts.*
- *(iii) Write legibly and draw clear diagrams wherever required.*
- *(iv) Scientific and non-programmable calculators are permitted.*

Part A

Answer **all** the Questions. **Each** question carries **two** marks.   (5Qx2M=10)

1.   Classify structures based on geometry.

2.   What is a statically determinate structure?

3.   Calculate the degree of freedom for the following beams shown in figure 1 and figure 2
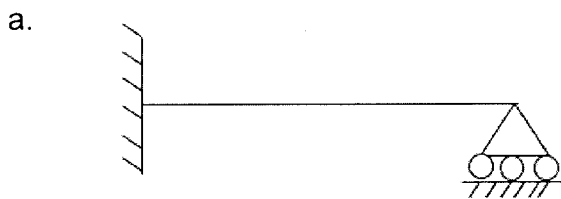
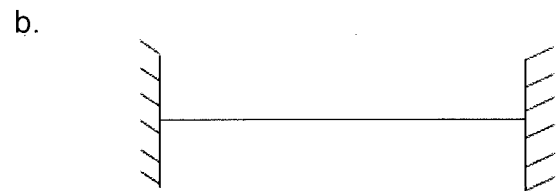a.   b.

Figure 1   **Figure 2**

4.   What are the assumptions made in truss analysis?

5.   What is meant by a redundant truss?

Part B

Answer the Question. Question carries **fifteen** marks. (1Qx15M=15)

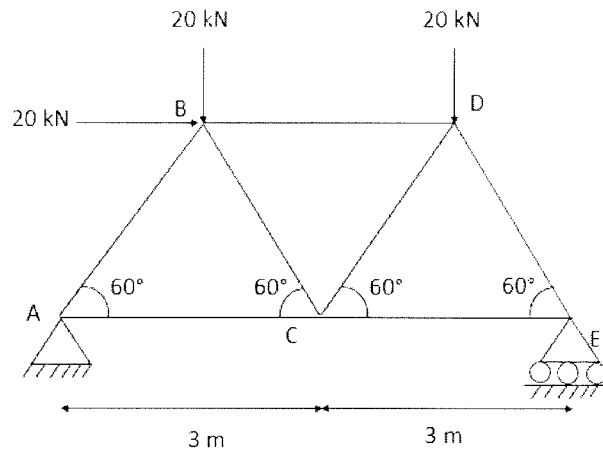6. Analyse the truss given in figure 3 by the method of joints and tabulate the results.

Figure 3

Part C

Answer the Question. Question carries **fifteen** marks. (1Qx15M=15)

7. A symmetrical three hinged parabolic arch hinged at the crown and supports has a span of 30 m and a rise of 10 m. It carries an UDL of 20 kN/m over the left half of the span. Draw the bending moment diagram.

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TEST – 2

Even Semester: 2018-19   **Date**: 15 April 2019

Course Code: CIV 205   **Time**: 1 Hour

Course Name: Structural Analysis - I   **Max Marks**: 40

Program & Sem: B.Tech & IV Sem   **Weightage**: 20%

Instruction:
(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Write legibly and draw clear diagrams wherever required.
(iv) Scientific and non-programmable calculators are permitted.

Part A
Answer the Question. The Question carries **ten** marks.   (1Qx10M=10M)

1. A suspension cable having supports at the same level has a span of 30 m and a maximum dip of 6 m. The cable supports a UDL of 10 kN/m throughout its length. Find the maximum tension in the cable and the diameter of the cable if the permissible stress in the material is 300 N/mm^2.

Part B
Answer the Question. The Question carries **twenty** marks.   (1Qx20M=20M)

2. One of the cables of a suspension bridge has a span of 300m and a dip of 15 m. It carries a UDL of 30 kN/m throughout its length. The backstay cable is inclined at 30° to the vertical and passes over:
   a) Pulley support
   b) Saddle on Roller
   For each Case, find:
   i) The maximum tension in the cable and its inclination at the support.
   ii) The vertical force on the tower
   iii) The bending moment experienced by the tower if the height of the tower is 25 m.

Part C
Answer the Question. The Question carries **ten** marks.   (1Qx10M=10M)

3. Find the slope and deflection at the free end using moment area method for the beam shown in figure 1. EI is constant.
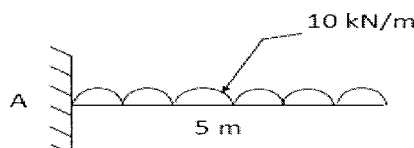

Figure 1

6. Analyse the beam shown in figure 5 using consistent deformation method   [15 marks] and draw BMD.
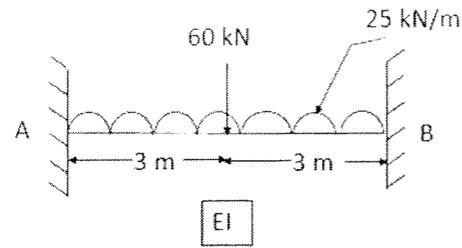

Figure 5

Instructions:
  (i) Read the question properly and answer accordingly.
  (ii) Question paper consists of 3 parts.
  (iii) Write legibly and draw clear diagrams wherever required.
  (iv) Scientific and non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **one** mark.   (20Qx1M=20M)

1.   Choose the most appropriate answer from the given options:

i.   The number of unknown reactions for a pinned/hinged support are
     a. 1   b. 2   c. 3   d. 4

ii. How many equilibrium equations do we need to solve generally on each joint of a truss?
     a. 1   b. 2   c. 3   d. 4

iii. If a member of a truss is in compression, then what will be the direction of force that it will apply to the joints?
     a. Away   b. Towards   c. Depends on the   d. No force will be
                                            case   there

iv. The highest point in an arch is called
     a. Soffit   b. Crown   c. Center   d. Abutment

v.   Degree of indeterminacy for a propped cantilever
     a. 1   b. 2   c. 3   d. 4

vi. Roller is replaced by fixed support in conjugate beam. Is this statement
     a. TRUE   b. FALSE   c. Can't say   d. Depends upon type
                                                               of load

vii. Shear force at any section in the conjugate beam gives ---------- in the actual beam
     a. Slope   b. Curvature   c. Deflection   d. Bending moment

viii. The point of contraflexure is the point where
a. S.F is zero   b. B.M. is maximum   c. B.M. is minimum   d. B.M. is zero

ix. If a beam is subjected to UDL, the bending moment varies ------------.
a. Linearly   b. Parabolically   c. Cubic Parabolically   d. None

x. Bending moment for a simply supported beam when the load 'W' is at centre with span length 'L', is
a. WL/4   b. $WL^2/4$ c. WL/8   d. $WL^2/8$

xi. If in a pin jointed plane frame m = 2j − 3, where 'm' is the number of members, and 'j' is the number of joints, then the frame is
a. Stable   b. Overstable   c. Unstable   d. None

xii. For a cantilever beam with full UDL, the area of the BMD is given by
a. 2/3*k*L (or) 2/3*a*h   b. 1/3*k*L (or) 1/3*a*h   c. k*L (or) a*h   d. 1/4*k*L (or) 1/4*a*h

xiii. In conjugate beam method, the free end is replaced with
a. free   b. fixed   c. pinned   d. roller

xvi. The maximum bending moment for a simply supported beam subjected to an UDL over the entire span is
a. WL/4   b. $WL^2/12$ c. WL/8   d. $WL^2/8$

xv. In moment area method, moment of area of bending moment diagram (Mohr's 2nd theorem) gives
a. Slope   b. Curvature   c. Deflection   d. Bending moment

xvi. Degree of indeterminacy for a fixed beam
a. 1   b. 2   c. 3   d. 4

xvii. Slope of a simply supported beam when subjected to central point load is
a. WL/16EI   b. $WL^2/16EI$ c. $WL^3/48EI$ d. $5WL^4/384EI$

xviii. Slope of a simply supported beam when subjected to Uniformly distributed load (UDL) is
a. $WL^3/24EI$ b. $WL^2/16EI$ c. $WL^4/384EI$ d. $5WL^4/384EI$

xix. Slope of a cantilever beam when subjected to Uniformly distributed load (UDL) is given as
a. $WL^2/3EI$ b. $WL^2/2EI$ c. $WL^4/384EI$ d. $5WL^4/384EI$

xx. Slope of a cantilever beam when subjected to Point load at the free end is given as
a. $WL^3/3EI$ b. $WL^4/8EI$ c. $WL^3/6EI$ d. $5WL^4/384EI$

Part B

Answer **both** the Questions.   (2Q= 25M)

2. Analyse the beam shown in figure 1 using conjugate beam method and find the slope at the supports and deflection at the centre.   [10 marks]
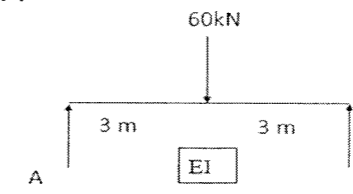
Figure 1

3. Analyse the beam shown in figure 2 using consistent deformation method and draw BMD.   [15 marks]
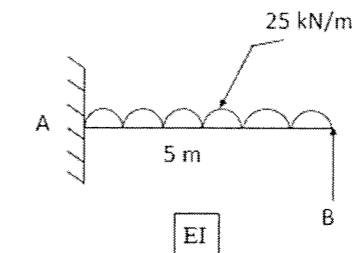
Figure 2

Part C

Answer **all** the Questions.   (3Q=35 M)

4. Analyse the beam shown in figure 3 using conjugate beam method and find the slope at the supports and deflection under the load.   [10 marks]
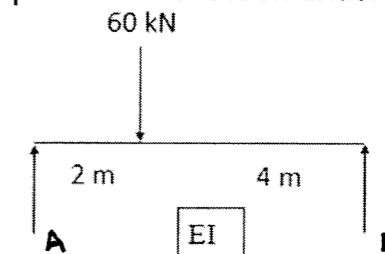
Figure 3

5. Analyse the beam shown in figure 4 using conjugate beam method and find the slope and deflection at the free end. Take EI = 5 x 10^3 kNm^2 [10 marks]

Figure 4
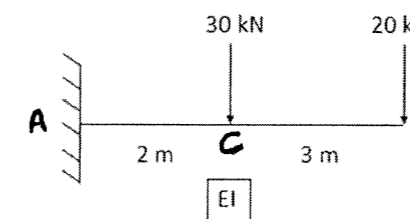
PRESIDENCY UNIVERSITY
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SCHOOL OF ENGINEERING

SUMMER TERM / MAKE UP END TERM EXAMINATION

Semester: Summer Term 2019

Course Code: CIV 205

Course Name: Structural Analysis - I

Program & Sem: B.Tech & IV Sem (2016 Batch)

Date: 22 July 2019

Time: 2 Hours

Max Marks: 80

Weightage: 40%

Instruction:
(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Write legibly and draw clear diagrams wherever required.
(iv) Scientific and non-programmable calculators are permitted.

Part A

Answer the following question. Question carries **fifteen** marks.   (1Qx15M=15 Marks)

1. A suspension bridge of 50 m span and 4 m wide is subjected to a load of 50 kN/m². The bridge is suspended by pair of cables having central dip of 5 m. Find the tension force induced in one of the cables and calculate necessary cross-section area required for the cable. Take permissible stress in a cable is 1500 N/mm².

Part B

Answer **both** the questions. **Each** question carries **fifteen** marks.   (2Qx15M=30 Marks)

2. Find the slope at A and B and the deflection under the 50 kN load, for a simply supported beam as shown in figure 1 by moment area method.
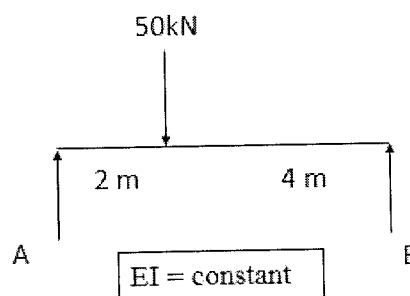
50kN

2 m   4 m

A   B

EI = constant

Figure 1

3. Find the slope at the supports and maximum deflection for the beam shown in the figure 2, using conjugate beam method
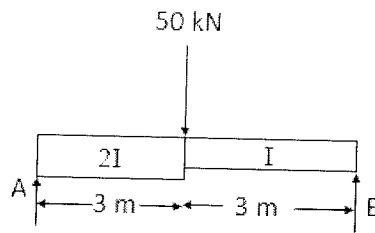
50 kN

2I I

A
|← 3 m →|← 3 m →| B

Figure 2

Part C

Answer **all** the questions. The marks to each question is given beside it.

(3 Q = 35 Marks)

4. Find the maximum slope and deflection for a cantilever beam as shown in figure 3 by moment area method. Take EI = 10.3×10^3 kNm^2 [15 marks]
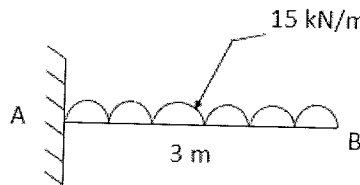
15 kN/m

A
3 m B

Figure 3

5. Find the slope at the supports and maximum deflection for the beam shown in the figure 4, using conjugate beam method [10 marks]
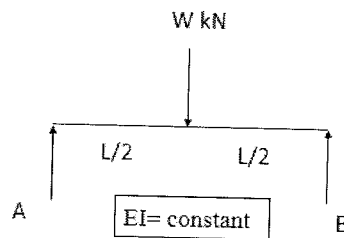
W kN

L/2 L/2

A EI= constant B

Figure 4

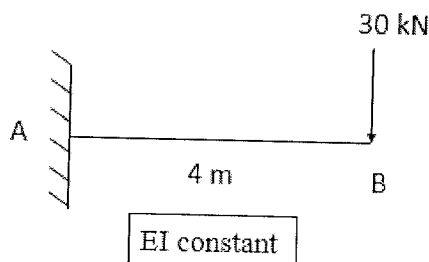6. Find the maximum slope and deflection for the beam shown in the figure 5, using conjugate beam method [10 marks]

30 kN

A
4 m B

EI constant

Figure 5