Heaven's Light is Our Guide

DEPARTMENT OF CIVIL ENGINEERING

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

B.Sc. Engineering THIRD Year EVEN SEMESTER Examination, 2020

CE 3213

Structural Analysis & Design -II

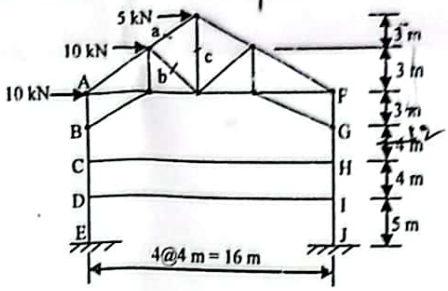
Full marks: 72 **Time: 3 Hours**

N.B:- (i) Answer any SIX questions, taking THREE from each section.
(ii) Figures in the margin indicate full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data missing.

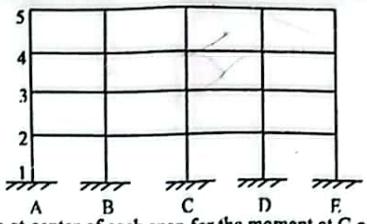
SECTION-A

Q.1 (a) Write down the assumptions made in the portal method. 2.00

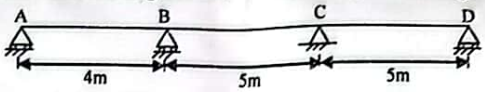
(b) Determine the stresses in members a, b and c. Draw shear force and bending moment diagram for the members AE and CH as shown in figure below. 10.00



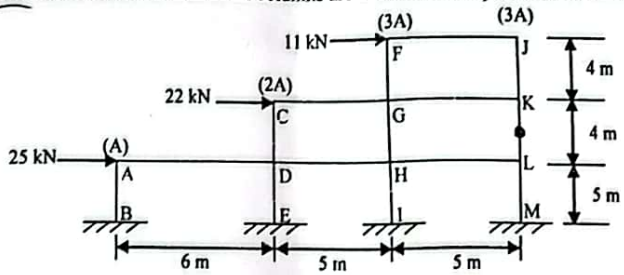
Q.2 (a) Draw qualitative influence line for maximum negative moment at the left end of the span C4-D4 as shown in figure below. Also, locate the position of live load to find the maximum negative moment at that end. 4.00



(b) Compute the ordinates influence line at center of each span for the moment at C of the continuous beam shown in figure below. Also, draw the influence line diagram. EI is constant throughout the length of the beam. 8.00

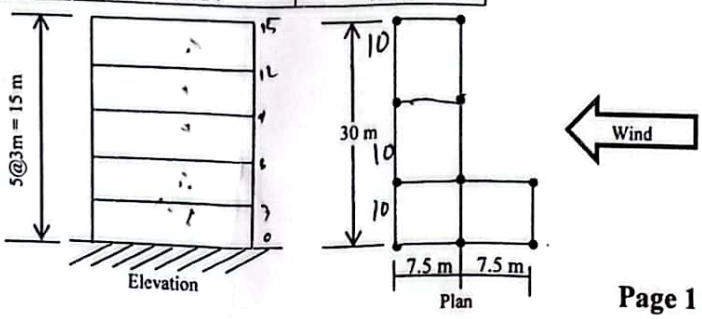


Q. 3 Analyze the building frame shown in figure below using cantilever method. Draw shear force and bending moment diagrams of all members. Cross sectional area of all columns are shown at the top of each column. 12.00



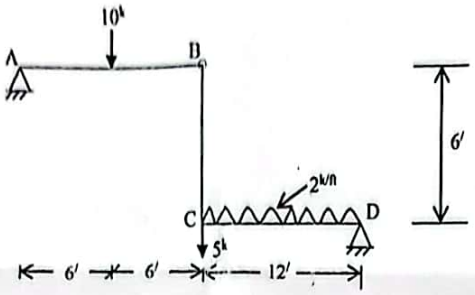
Q. 4 Compute the design force and earthquake load at each floor level for the following five story building with the given data (as per BNBC). Seismic zone coefficient = 0.075, structure importance coefficient = 1.00, response modification coefficient = 8.00, structural type coefficient = 0.040, site coefficient for soil characteristics = 1.50, seismic dead load = 2100 kN/floor, velocity to pressure conversion coefficient = 47.2×10^{-6}, basic wind speed = 155 km/hr, and pressure coefficient = 1.45. 12.00

z (meter)	Coefficient C_z	Coefficient G_h
0.0 – 4.5	0.368	1.654
6.0	0.415	1.592
9.0	0.497	1.511
12.0	0.565	1.457
15.0	0.624	1.418

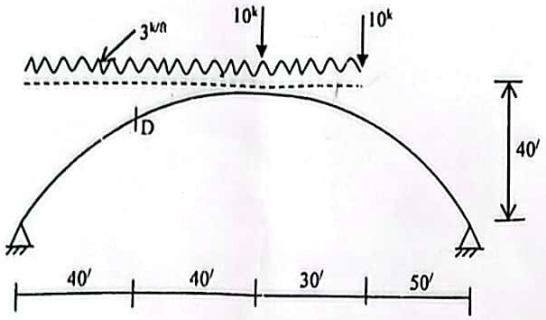


SECTION-B

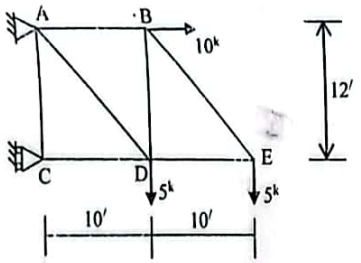
Q. 5 Calculate vertical deflection at 'C' and rotational deflection 'θ_{BC}' for the frame shown below. E = 30x10³ ksi, and I = 200 in⁴. 12.00



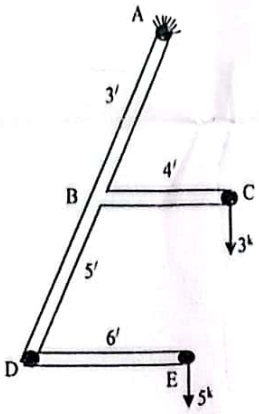
Q. 6 Find the position and magnitude of maximum bending moment. Calculate shear force and normal thrust at 'D'. 12.00



Q. 7 Find the vertical deflection of 'E' and rotational deflection of member 'AB' for the truss shown below. Cross-sectional area of each member is 3 in². E = 30x10³ ksi. 12.00



Q. 8 The pipe bracket shown below, having ∠ABC, ∠CBD, ∠BDE 90° angle each, and located in horizontal plane. Find (i) vertical deflection at 'E', (ii) rotational deflection of 'E' about DE axis. I = 15 in⁴, E = 30 x 10³ ksi, and G = 12000 ksi. 12.00



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DEPARTMENT OF CIVIL ENGINEERING

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

B.Sc. Engineering **Third Year Even** Semester Examination, 2019

CE 3213

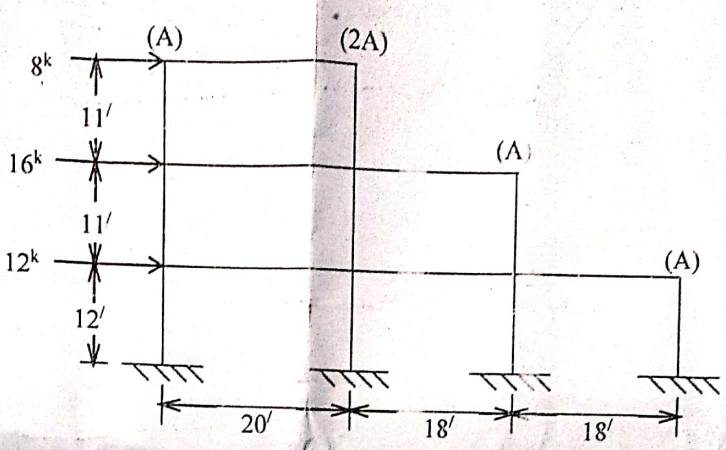
Structural Analysis & Design -II

Full marks: 72 **Time: 3 Hours**

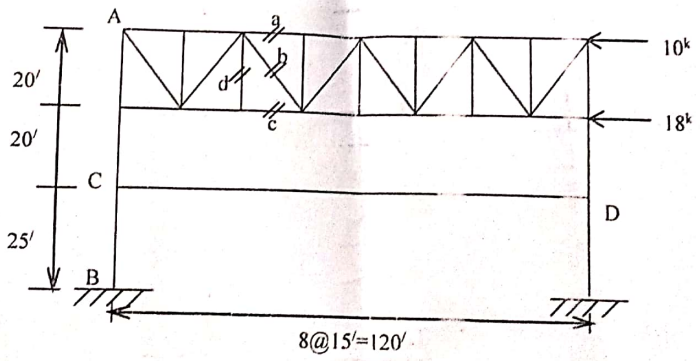
N.B:-
(i) Answer any **SIX** questions, taking **THREE** from each section.
(ii) Figures in the margin indicate full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data missing.

SECTION-A

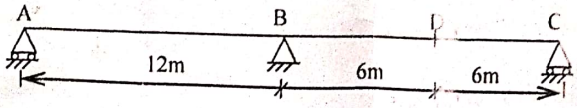
Q.1 Analyze the building frame shown in figure below using Cantilever method. Draw SFD and BMD of all the members. Cross sectional areas of all columns are shown at the top of each column. 12.00



Q.2 Determine the stresses in members a, b, c and d of the portal frame shown in figure below. Also draw SFD and BMD of the members AB and CD. 12.00

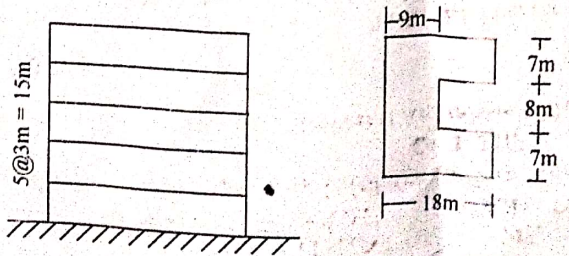


Q.3 Determine the influence line for the shear force and the bending moment at section D of a continuous beam ABDC as shown in figure below. 12.00



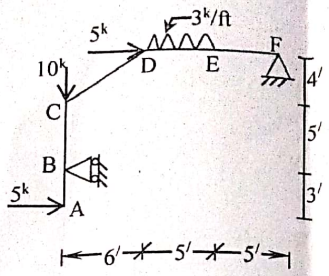
Q.4(a) State Muller – Breslau principle. 2.00

(b) Calculate the design wind force and earthquake force at each floor level for the following five storied building as shown in figure below. (Follow BNBC) 10.00

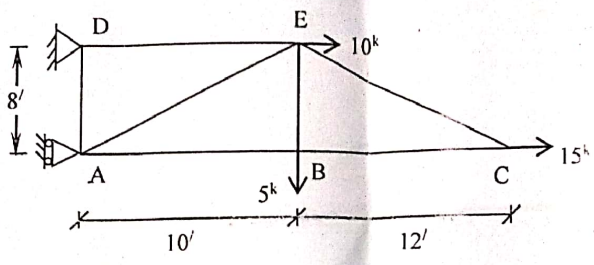


SECTION-B

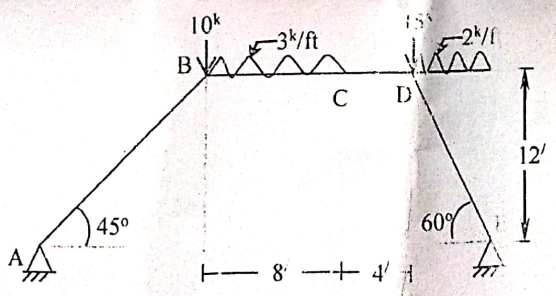
Q.5 Find vertical deflection and horizontal deflection at A for the frame below. 12.00
Use $E = 30 \times 10^3$ ksi, $I = 100$ in^4.



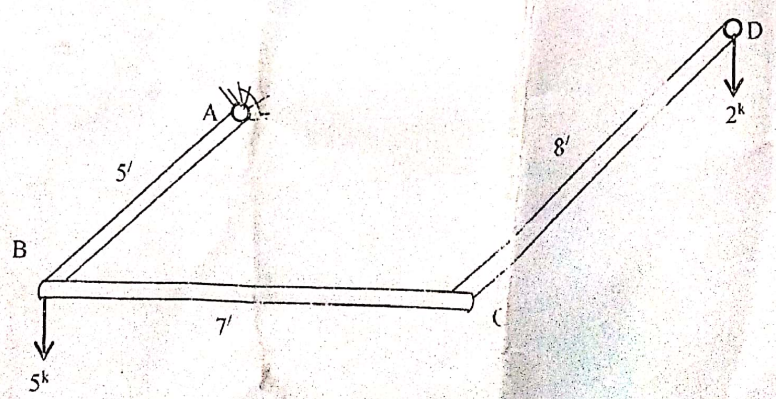
Q.6 Find vertical deflection at C and rotational deflection of member AB of the truss shown below. Cross-sectional area for each member is 3 in^2, $E = 30 \times 10^3$ ksi. 12.00



Q.7 Determine horizontal thrust developed and draw BMD of the two hinged arch shown below. 12.00
[Use $E = 30 \times 10^6$ psi, $I = 500$ in^4]



Q.8 Standard pipe bracket shown below having 90° angle at B and C and located in same plane. Find (i) vertical deflection of C (ii) rotational deflection of D about the axis of CD. 12.00
[$I = 10$ in^4, $G = 12000$ ksi, $E = 30 \times 10^3$ ksi].



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DEPARTMENT OF CIVIL ENGINEERING

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

B.Sc. Engineering **THIRD** year **EVEN SEMESTER** Examination, 2018

CE 3213

Structural Analysis & Design - II

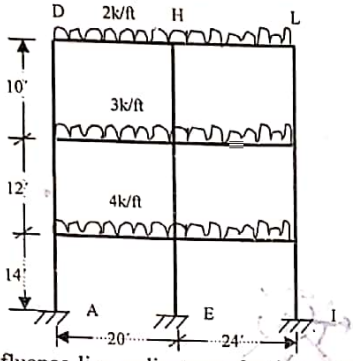
Full Marks: 72 **Time: 3 Hours**

N.B.:-
(i) Answer SIX questions, taking THREE from each section.
(ii) Figure in the margin indicates full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data not given.

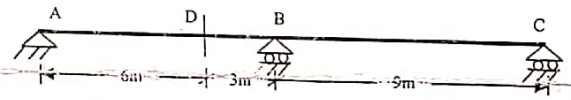
SECTION-A

Q.1(a) State the assumptions made for analyzing building frame for vertical load. 2.00

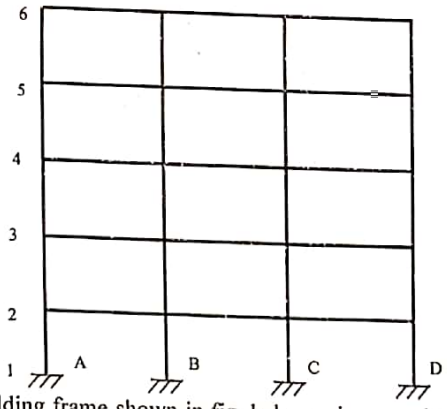
Q.1(b) Analyze the building frame shown in fig. below. Draw SFD & BMD for all the members of the frame. 10.00



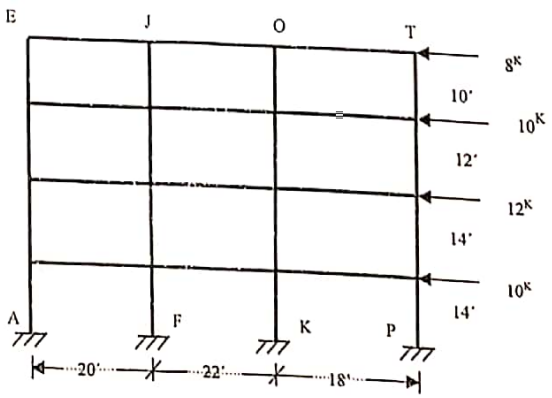
Q.2(a) Compute the influence line ordinates at 3m intervals for shear at D of the continuous beam ABC shown in fig. below. 7.00



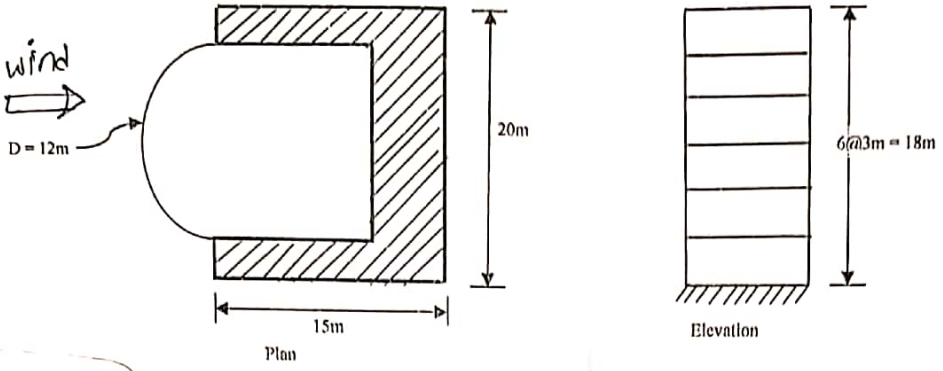
Q.2(b) Draw qualitative influence line for moment at the top of column C2-C3 (right side tension) for the frame shown in fig. below. Locate the positions of live load to produce the maximum moment at the aforementioned section. 5.00



Q.3 Analyze the building frame shown in fig. below using portal method. Draw SFD & BMD for all the members of the frame. 12.00



Q.4 Calculate the design wind forces and earthquake loads at each floor level for the following six storied commercial building constructed within Dhaka city (Follow BNBC). 12.00

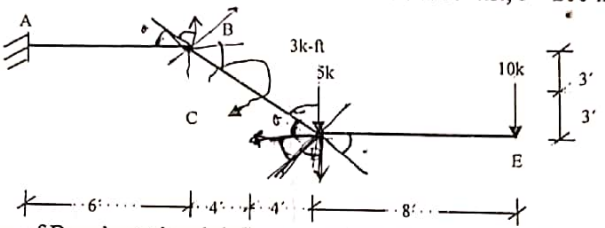


Pressure co-efficient = 1.45, Response modofication co-efficient = 8.00, Structure type co-efficient = 0.049, Seismic dead load = 1800 kN/floor.

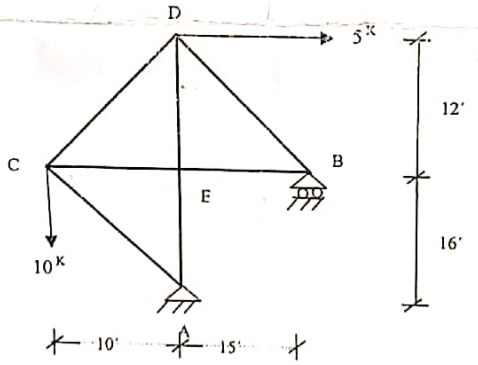
Z(meter)	0-4.5	6.0	9.0	12.0	15.0	18.0
Co-efficient C_z	0.368	0.415	0.497	0.565	0.624	0.677
Co-efficient G_h	1.654	1.592	1.511	1.457	1.418	1.388

SECTION-B

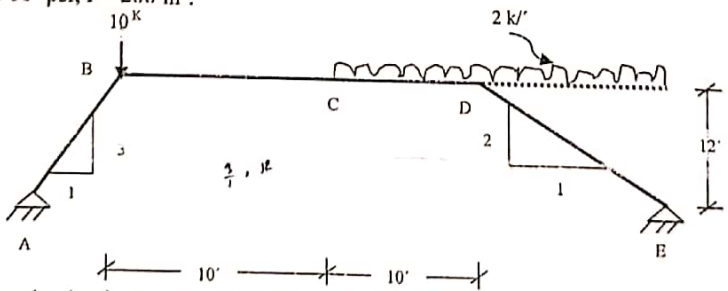
Q.5 Calculate vertical, horizontal and rotational deflection at E. E = 30 x 10^3 ksi, I = 200 in^4. 12.00



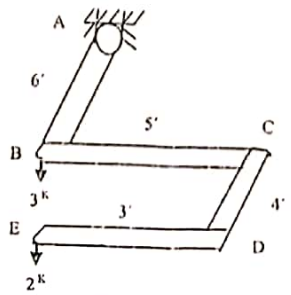
Q.6 Find horizontal deflection of B and rotational deflection of CE of truss below. X-sectional area of all the members are $2in^2$. E = 30 x 10^3 ksi. 12.00



Q.7 Determine horizontal thrust and draw BMD for the two hinged arch shown below. E = 30 x 10^6 psi, I = 200 in^4. 12.00



Q.8 A pipe bracket having angle 90° at B, C, and D and located in a horizontal plane is shown below. Find (i) vertical deflection of E (ii) rotational deflection of E about DE. I = 18 in^4, G = 12000 ksi, E = 30 x 10^3 ksi. 12.00



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DEPARTMENT OF CIVIL ENGINEERING

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

B.Sc. Engineering **THIRD** year **EVEN SEMESTER** Examination, 2017

CE 3213

Structural Analysis & Design-II

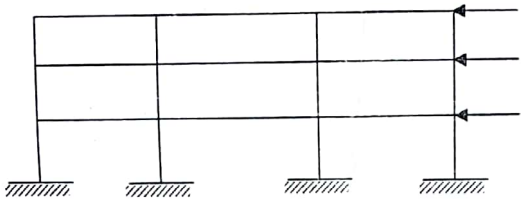
Full Marks: 72 **Time: 3 Hours**

N.B.:-
(i) Answer SIX questions, taking THREE from each section.
(ii) Figure in the margin indicates full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data not given.

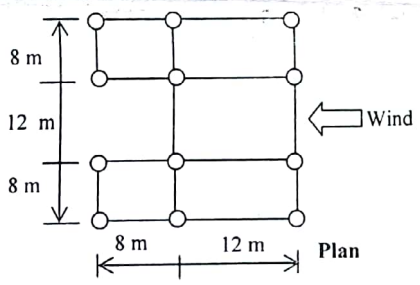
SECTION-A

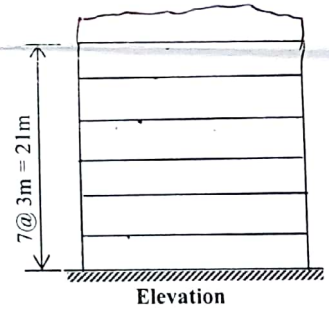
Q.1(a) State the assumptions made for analyzing the building frames. 5.0

(b) Draw qualitative moment diagram and deflected shape of the rigid frame shown in figure below. 7.0



Q.2 Calculate the design wind forces and earthquake loads at each floor level for the following seven storied hospital building as shown in figure below constructed within Rajshahi city. (Follow BNBC) 12.0

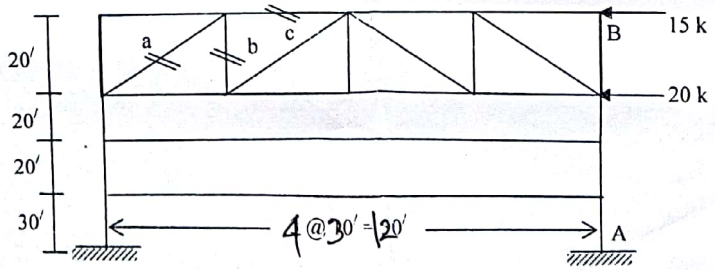




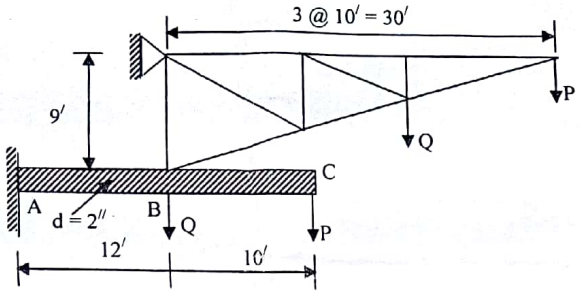
Response modification coefficient = 8.00, structure type coefficient = 0.049; seismic dead load = 1500 kN/floor and pressure coefficient = 1.50.

z (meters)	0 - 4.5	6.0	9.0	12.0	15.0	18.0	21.0
coefficient, C_z	0.368	0.415	0.497	0.565	0.624	0.677	0.725
coefficient, G_h	1.654	1.592	1.511	1.457	1.418	1.388	1.363

Q.3 Determine the stresses in the member a, b and c of the portal frame shown in figure below. Also draw SFD and BMD for the column AB. 12.0

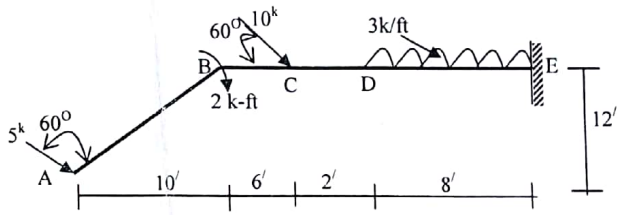


Q.4 A part of an electric transmission tower, made of steel, is supported by a steel beam ABC and carried concentrated loads P and Q as shown in figure below. Calculate vertical deflection at B if the value of P is zero and Q = 10 kips. Also draw SFD and BMD of the beam ABC. Cross-sectional area of each member of the truss is 0.15 in^2. 12.0

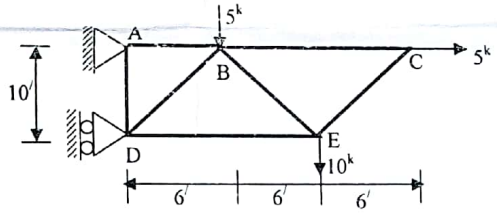


SECTION-B

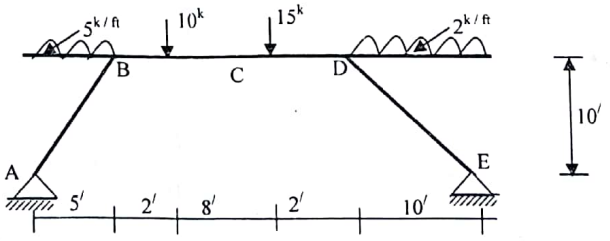
Q.5 Find vertical and rotational deflections at A and B respectively. E= $30x10^3$ksi, I = 200 in^4. 12.0



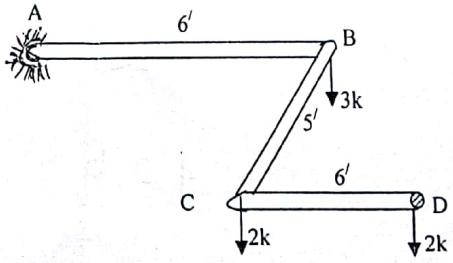
Q.6 Find vertical deflection of E and rotational deflection of BC member. Cross-sectional area of all members is 2 in^2 and E = 30 $x10^6$ ksi. 12.0



Q.7 Determine horizontal thrust and draw BMD for the two hinged arch as shown below. 12.0
E = $30x10^6$ psi, I = 300 in^4.



Q.8 The standard pipe bracket shown in figure below having 90° angle at B and C located in a horizontal plane. Find vertical deflection of D, rotational deflection of D about the axis CD. I = 30 in^4, G = 12,000 ksi, E= 30 $x10^6$ psi. 12.0



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DEPARTMENT OF CIVIL ENGINEERING
RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering THIRD year EVEN SEMESTER Examination, 2016

CE 3213
Structural Analysis & Design-II

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Full Marks: 72 **Time: 3 Hours**

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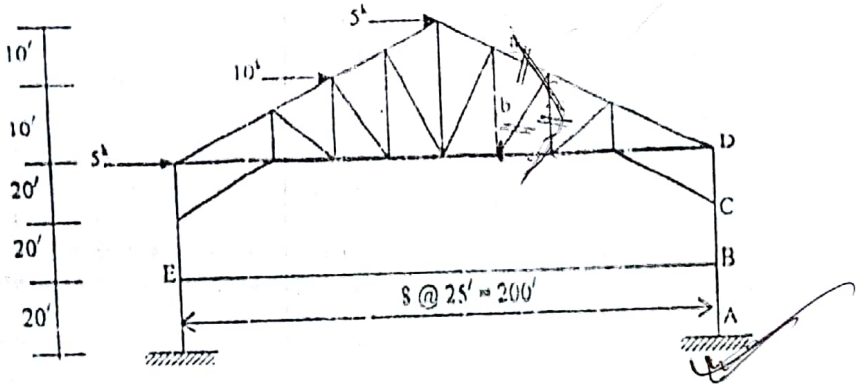
(i) Answer SIX questions, taking THREE from each section.
(ii) Figure in the margin indicates full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data not given.

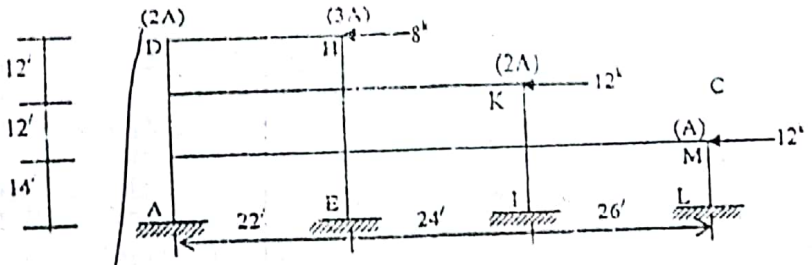
SECTION-A

Q.1(a) State the assumptions made for analyzing the building frame using cantilever method. 2.0

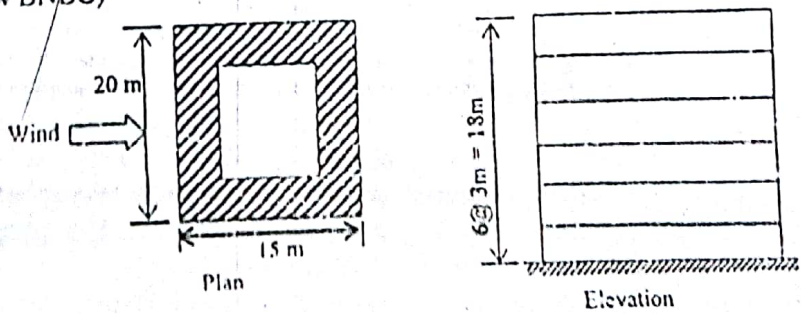
(b) Determine the stresses in the member a, b and c of the mill bents as shown in figure below. Draw SFD and BMD for the members AD and BE. 10.0



Q.2 Analyze the building frame shown in figure below using cantilever method. Draw SFD and BMD for all the members. Areas are shown at the top of each column. 12.0



Q.3 Calculate the design wind forces and earthquake loads at each floor level for the following six storied hospital building as shown in figure below constructed within Rajshahi city. (Follow BNBC) 12.0



Response modification coefficient = 9.00, structure type coefficient = 0.049; seismic dead load = 1500 kN/floor and pressure coefficient = 1.50.

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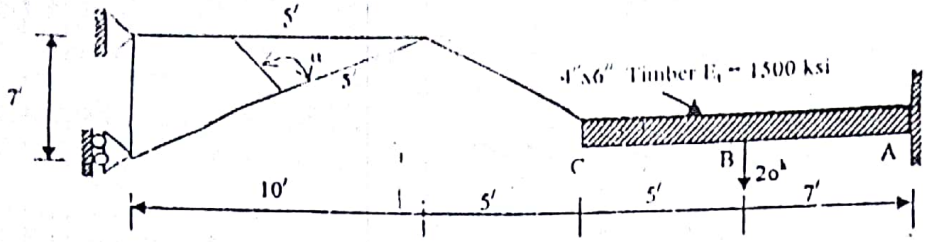
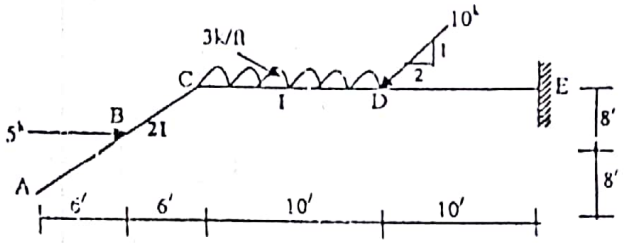
coefficient, C_z	0.368	0.415	0.497	0.565	0.624	0.677
coefficient, C_h	1.654	1.592	1.511	1.457	1.418	1.388

Q.4 A cantilever timber beam is supported by a steel truss as shown in figure below. Cross-sectional area of each member of the truss is 0.2 in^2. Draw SFD and BMD of the beam. E_s= 30,000 ksi. 12.0

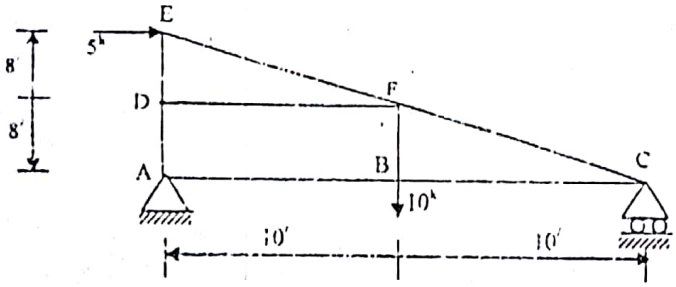


SECTION-B

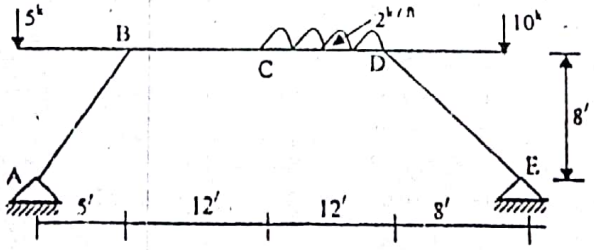
Q.5 Find horizontal, vertical and rotational deflection of c and rotational deflection at point A. 12.0
E= 30x10^{3}ksi, I = 200in^4.



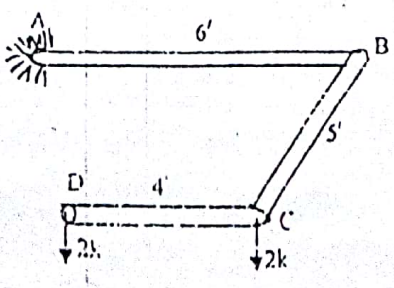
Q.6 Find horizontal deflection of C and rotational deflection of member AB of the truss shown in figure below. Cross-sectional area of all members is 3 in^2 and E = 30 x10^3 ksi. 12.0



Q.7 Determine horizontal thrust and draw BMD for the two hinged arch shown below. 12.0
E= 30x10^3 ksi, I = 400 in^4.



Q.8 The standard pipe bracket shown in figure below having 90° angle at b and C leveled in a horizontal plane. Find (i) vertical deflection of D (ii) rotational deflection of D in plane normal to the axis of CD. [I = 20in^4, G = 12,000 ksi, E= 30 x10^3 ksi] 12.0



Heaven's Light is Our Guide
DEPARTMENT OF CIVIL ENGINEERING
RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering **THIRD** year **SIXTH SEMESTER** Examination, 2015

130070

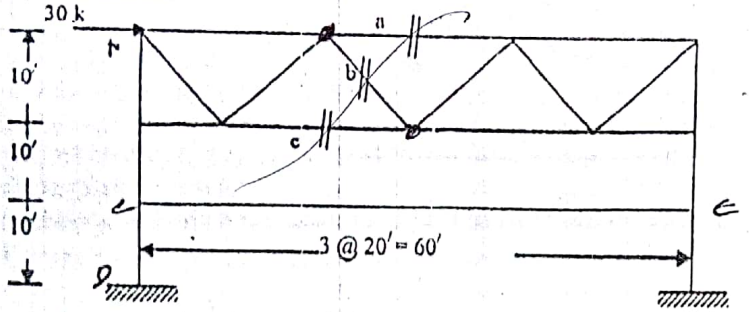
CE 313
Structural Analysis & Design - II

Full Marks: 70 **Time: 3 Hours**

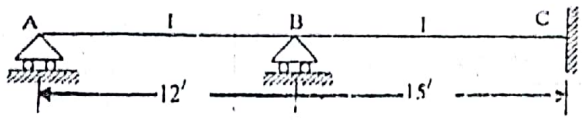
N.B.:- (i) Answer SIX questions, taking THREE from each section.
(ii) Figure in the margin indicates full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data not given.

SECTION-A

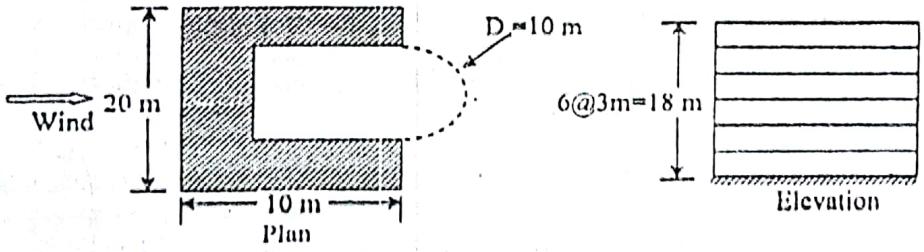
Q.1(a) State the assumptions made to analyze the building frame due to vertical loads. 2.00
(b) Determine the stresses in the member a, b and c of the portal frame as shown in figure below. Draw SFD and BMD for the members AD and CE. 9.67



Q.2(a) Derive the equations for fixed-end moments induced by displaced supports of prismatic members. 5.00
(b) Using the moment distribution method find the joints moments caused by a rotation of 0.002 radian anticlockwise at support C for the beam shown in figure below. Draw SFD and BMD of the beam. E = 30,000 ksi and I = 200 in^4. 6.67



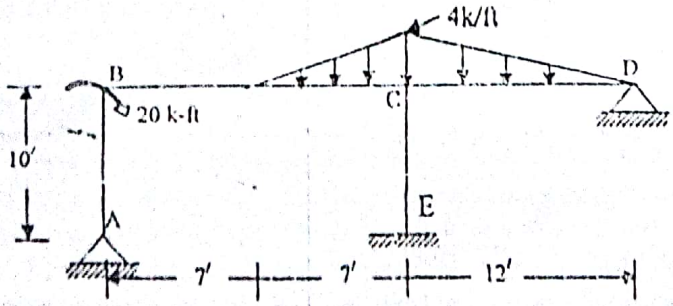
Q.3 Calculate the design wind forces and the earthquake loads at each floor level for the following six storied building constructed within Rajshahi City Corporation. (Follow BNBC). 11.67



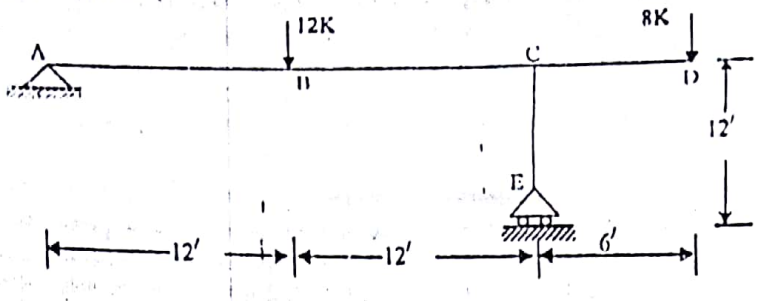
Structure importance coefficient = 1.00; Response modification coefficient = 9.00; Structure type coefficient = 0.049; Site coefficient for soil characteristics = 2.00; Seismic dead load = 1400kN/floor; and Pressure coefficient = 1.50.

Z (meters)	0-4.5	6.0	9.0	12.0	15.0	18.0
Coefficient, C_z	0.368	0.415	0.497	0.565	0.624	0.677
Coefficient, G_h	1.654	1.592	1.511	1.457	1.418	1.388

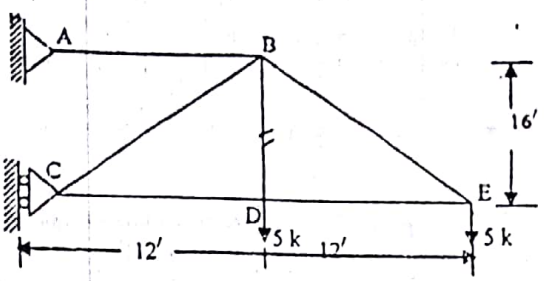
Q.4 Using moment distribution method analyze the frame shown in figure below. Draw BMD of the frame. 11.67



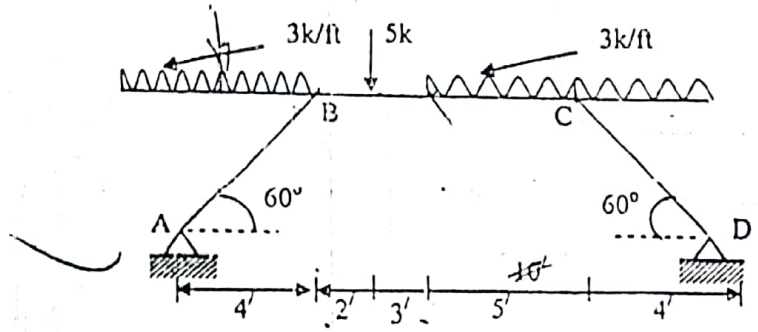
(b) Calculate vertical deflection of 'D' of the structure shown in figure below. [E = 30×10⁶ psi, I = 500 in⁴] 4.67 7.00



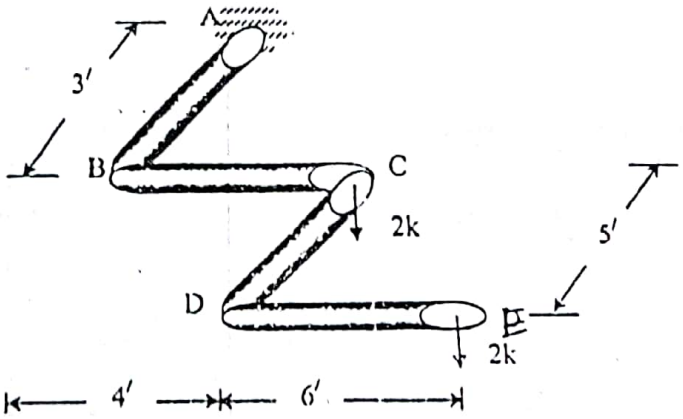
Q.6 Determine vertical deflection of 'E' and rotational deflection of member 'DE'. Cross-sectional areas of each of the member is 3 in². E = 30 x 10⁶ psi. 11.67



Q.7 Determine horizontal thrust developed and draw BMD of two hinged arch shown below. [E = 30×10⁶ psi, I = 500 in⁴]. 11.67



Q.8 A 4-in φ standard pipe bracket shown in figure below having a 90° angle at B, C and D and located in a horizontal plane. Find (i) vertical deflection of E (ii) rotational deflection of E about axis of DE. Plane moment of inertia = 10.6 in⁴, G = 12000 ksi, E = 30×10⁶ psi. 11.67



1200/0

Heaven's Light is Our Guide

DEPARTMENT OF CIVIL ENGINEERING
RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering THIRD year SIXTH SEMESTER Examination, 2014

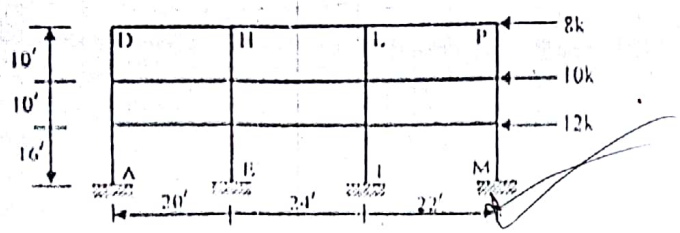
CE 313
Structural Analysis & Design - II

Full Marks: 70 Time: 3 Hours

N.B.: (i) Answer SIX questions, taking THREE from each section.
(ii) Figure in the margin indicates full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data missing

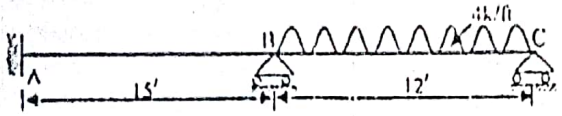
SECTION-A

Q.1 Analyze the rigid frame shown in figure below using portal method. Draw SFD and BMD for all the members. 11.67

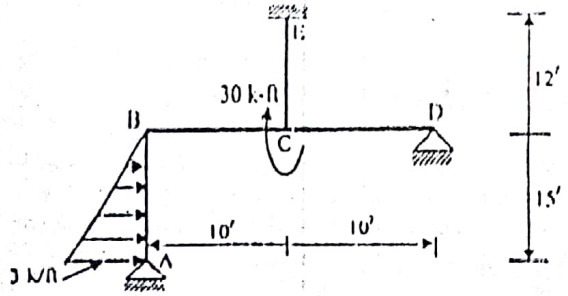


Q.2(a) Define absolute stiffness and derive its value for prismatic members. 4.67

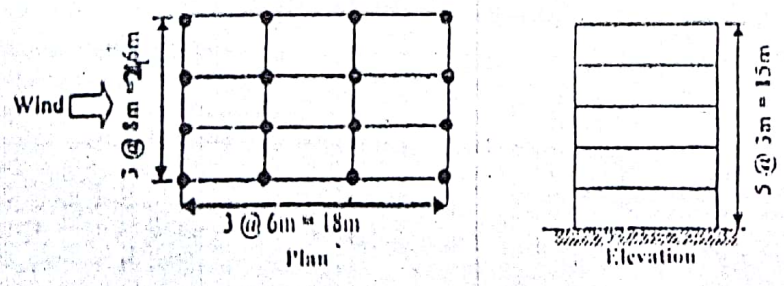
(b) Using moment distribution method find all joints moments for the beam shown in figure below. The support A rotates by 0.002 radian clockwise. Draw BMD of the beam. E = 30,000 ksi, I = 200 in^4. 7.00



Q.3 Using moment distribution method analyze the frame shown in figure below. Draw BMD of the frame. 11.67



Q.4 Calculate the earthquake loads and design wind forces at each floor level for the following five storied building (follow BNBC). 11.67



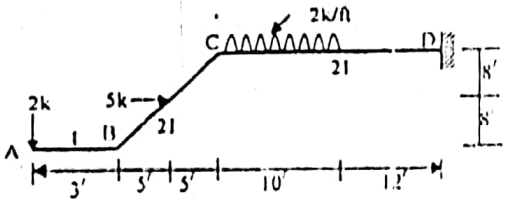
Seismic zone coefficient = 0.075; Structure importance coefficient = 1.00; Response

modification coefficient = 9.00; Structure type coefficient = 0.049; Site coefficient for soil characteristics = 1.50; Seismic dead load =1500 kN/floor; Velocity to pressure conversion coefficient = 47.2×10^{-6}; Basic wind speed = 155 km/h and pressure coefficient = 1.40.

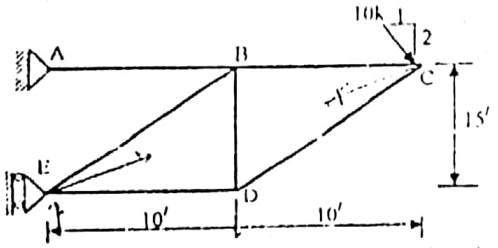
z (meters)	Coefficient, C_e	Coefficient, G_h
0 - 4.5	0.368	1.654
6.0	0.415	1.592
9.0	0.497	1.511
12.0	0.565	1.457
15.0	0.624	1.418

SECTION-B

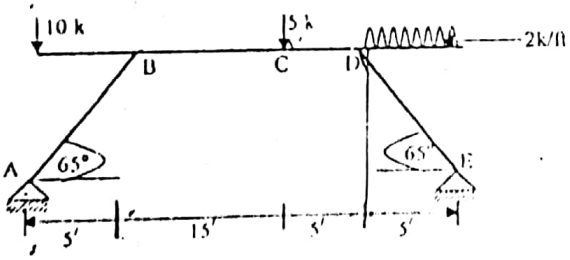
Q.5 Find horizontal, vertical and rotational deflection of point A by unit load method. [$E = 30 \times 10^3$ ksi, $I = 200$ in^4] 11.67



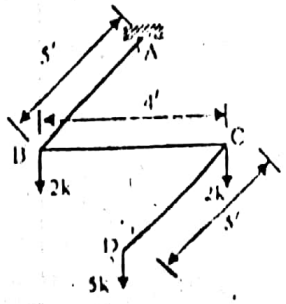
Q.6 Determine rotational deflection of member DE and relative displacement between joints CE. Cross sections area of each member is 2 in^2, $E = 30 \times 10^3$ ksi. 11.67



Q.7 Determine horizontal thrust and draw BMD of the two hinged arch shown below [$E = 30 \times 10^3$ ksi, $I = 200$ in^4] 11.67



Q.8 The standard pipe bracket shown in figure below having 90° angle at B and C and located in a horizontal plane. Find vertical deflection of D and rotational deflection of D about CD. [$I = 10$ in^4, $G = 12{,}000$ ksi $E = 30{,}000$ ksi]. 11.67



Heaven's Light is Our Guide

DEPARTMENT OF CIVIL ENGINEERING

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

B.Sc. Engineering Third year Sixth Semester Examination, 2013

CE 313

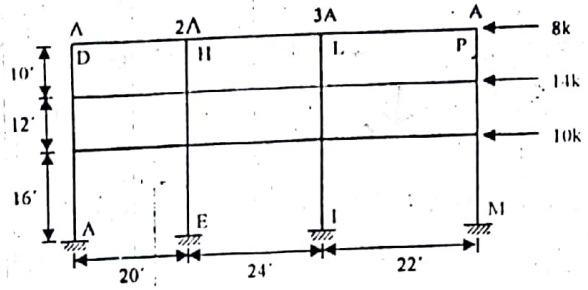
Structural Analysis & Design-II

Time: 3 Hours **Full marks: 70**

N.B:-
(i) Answer any SIX questions, taking THREE from each section.
(ii) Figure in the margin indicate full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data missing.

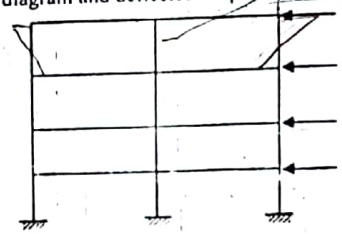
SECTION-A

Q.1 Analyze the rigid frame shown in figure below using cantilever method. Draw SFD & BMD for all the members. Cross-sectional area of columns is shown at the top of each column. 11.67

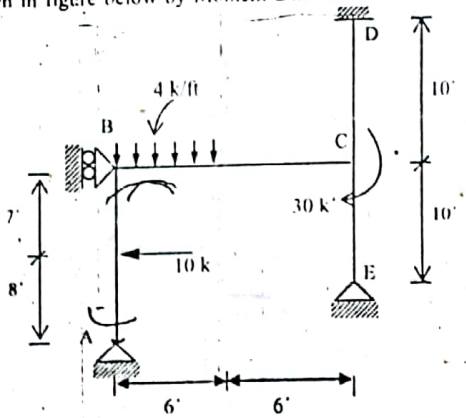


Q.2 (a) State the assumptions made for analyzing the building frame due to vertical load and lateral load. 5.67

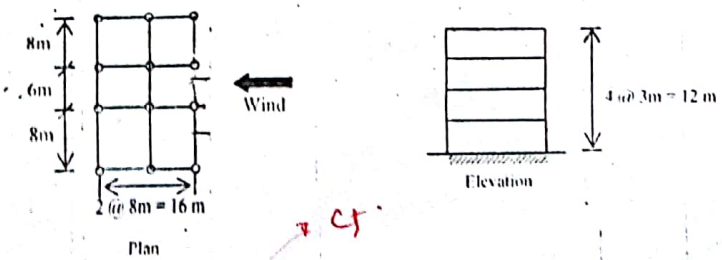
(b) Draw the qualitative moment diagram and deflected shape of the rigid frame shown in figure below. 6.00



Q.3 Analyze the frame shown in figure below by Moment Distribution Method. Draw BMD for the frame. EI is constant. 11.67



Q.4 Calculate the earthquake load and design wind force at each floor level for the following four storied building with the given data (follow BNBC). 11.67

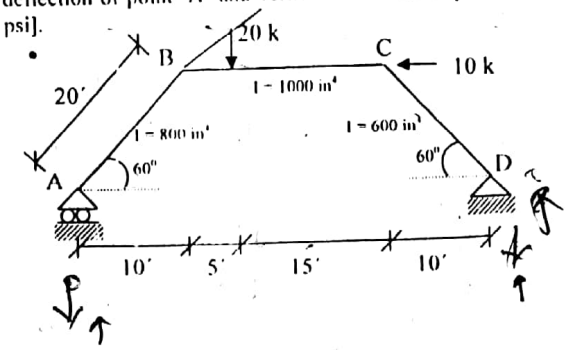


Seismic zone coefficient = 0.075; Structure importance coefficient = 1.00; Response modification coefficient = 8.00; Structure type coefficient = 0.040; Site coefficient for soil characteristics = 1.50; seismic dead load = 1400 kN/floor. Velocity to pressure conversion coefficient = 47.2×10^{-6}; Basic wind speed = 152 km/h and pressure coefficient = 1.40.

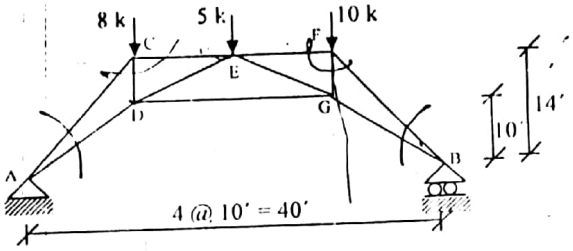
Z (meters)	Coefficient C_z	Coefficient G_h
0-4.5	0.368	1.654
6.0	0.415	1.592
9.0	0.497	1.511
12.0	0.565	1.457

SECTION-B

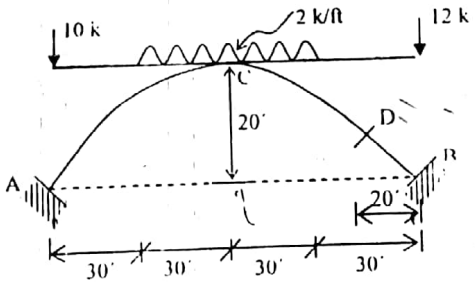
Q.5 Calculate horizontal deflection of point 'A' and vertical deflection of point 'B' of the frame shown in figure below. [E = 30 x 10^6 psi]. 11.67



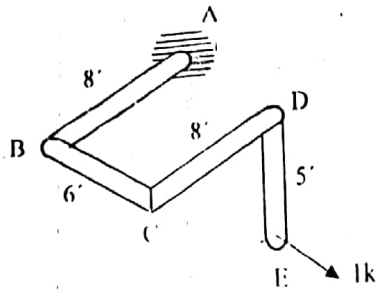
Q.6 Find horizontal deflection of 'B', and rotational deflection of member DG of truss shown in figure below. 11.67
Cross sectional area of all the members are 3 inch^2. E = 30,000 ksi.



Q.7 Determine position and magnitude of maximum bending moment. Find shear force and normal thrust at position 20' distance from right support. Neglect the rib shortening. 11.67



Q.8 Following is the standard pipe bracket constructed using 5-in φ pipe. Find horizontal deflection component of point E in a direction parallel to BC. Also find rotational deflection of E about the axis of CD. Members AB, BC, and CD are in a horizontal plane and DE is vertical. [Plane moment of inertia = 10.20 in^4, G = 12000 ksi, E = 30 x 10^3 ksi]. 11.67



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Heaven's Light is Our Guide

DEPARTMENT OF CIVIL ENGINEERING

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

B.Sc. Engineering **Third** year **Six** Semester Examination, 2012

CE 313

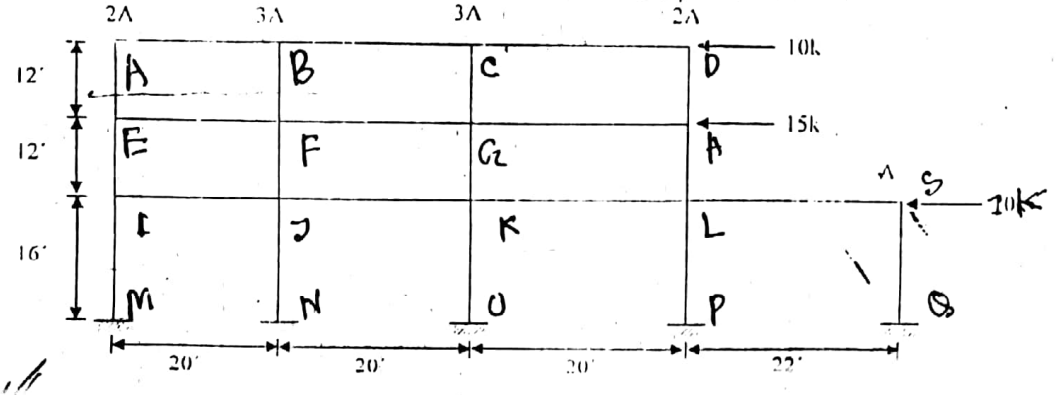
Structural Analysis & Design-II

Full marks: 70 **Time: 3 Hours**

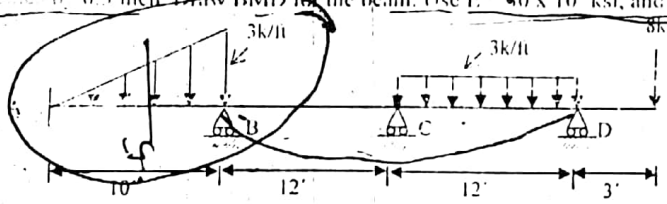
N.B:- (i) Answer any SIX questions, taking **THREE** from each section.
(ii) Figure in the margin indicate full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data missing.

SECTION-A

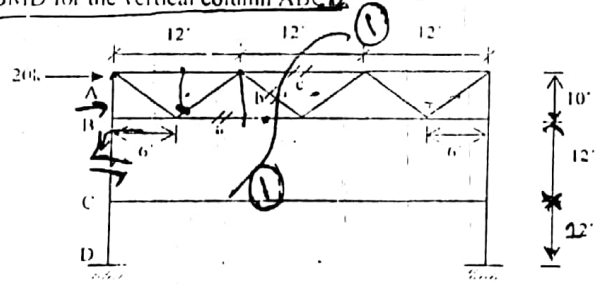
1. Analyze the building frame shown in figure below by cantilever method. Draw SFD & BMD for all the members. Cross-sectional areas of columns are shown at the top of each column. 11.67



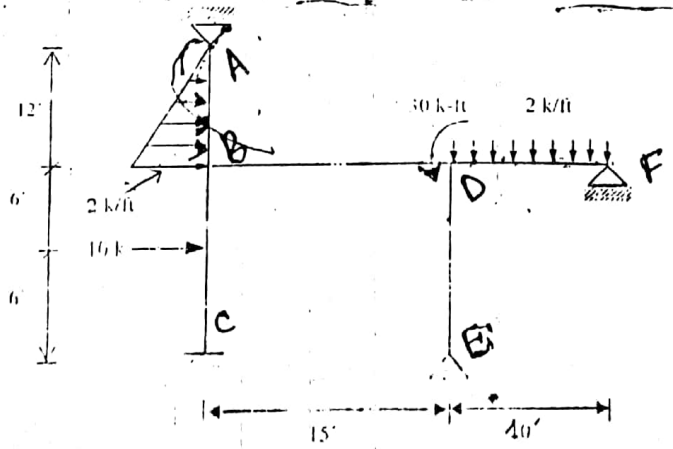
2. For the continuous beam ABCD loaded as shown in figure below, find all joint moments if the support C settles by 0.5 inch. Draw BMD for the beam. Use E = 30 x 10^3 ksi, and I = 200 in^4. 11.67



3. Determine the stresses in the members a, b, and c of the portal frame as shown in figure below. Also draw SFD and BMD for the vertical column ABCD. 11.67

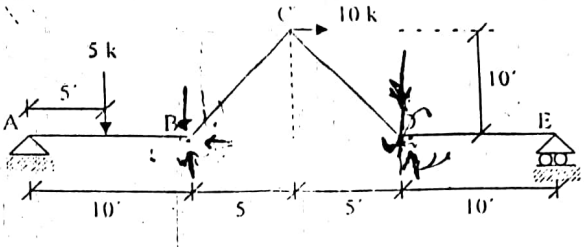


4. Analyze the frame shown in fig below by Moment Distribution Method. Draw BMD for the frame. EI is constant. 11.67

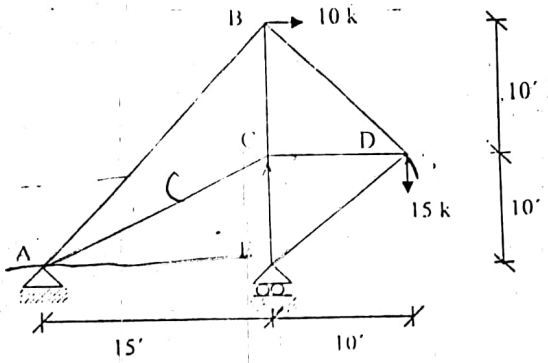


SECTION-B

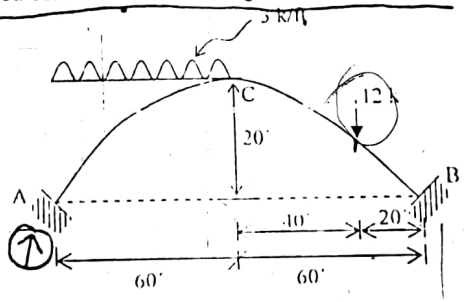
Q.5 Calculate vertical deflection and rotational deflection of point 'D' of figure shown below. [E = 30 x 10^3 ksi, I = 200 in^4.] 11.67



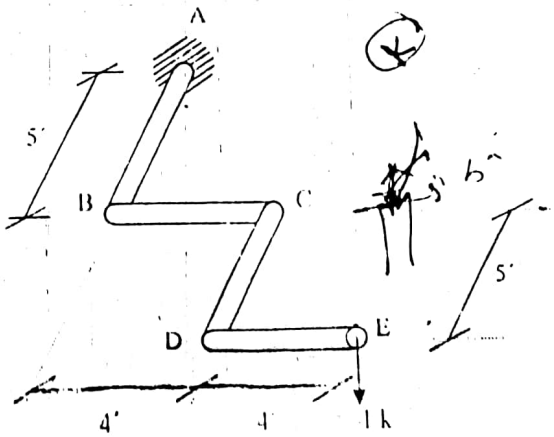
Q.6 Find horizontal deflection of joint B, vertical deflection of joint D and rotational deflection of member CD of truss shown in figure below. Cross sectional area of all the members are 3 $inch^2$. E = 30,000 k/si. 11.67



Q.7 Determine position and magnitude of maximum bending moment. Find shear force and normal thrust at the position of applied concentrated load. Neglect the rib shortening. 11.67



Q.8 Given a 4-in φ standard pipe bracket shown in figure below having a 90° angle at B, C and D and located in a horizontal plane. Find (a) The vertical deflection component of E (b) The rotational deflection component of E about the axis of DE. Plane moment of inertia = 10.25 in^4, G = 12000 ksi, E = 30 x 10^3 ksi. 11.67



Heaven's Light is Our Guide

DEPARTMENT OF CIVIL ENGINEERING

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

B.Sc. Engineering **Third** year **Sixth** Semester Examination, 2011

CE 313

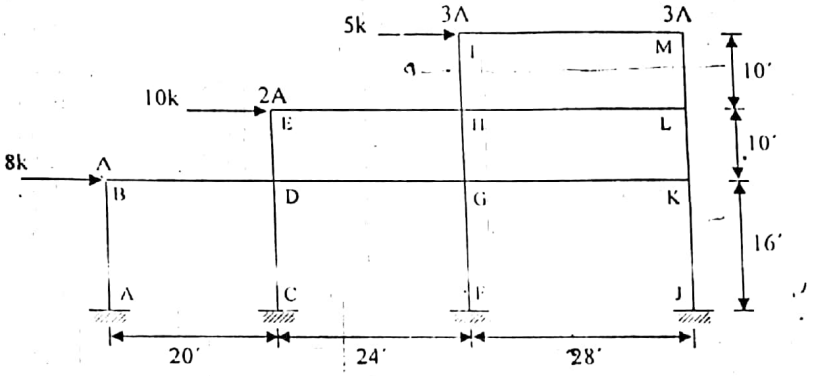
Structural Analysis & Design-II

Full marks: 70 **Time: 3 Hours**

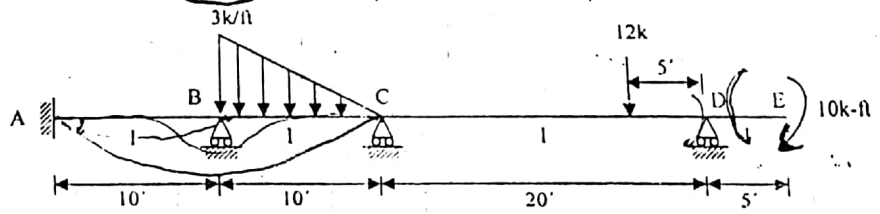
N.B:-
(i) Answer any **SIX** questions, taking **THREE** from each section.
(ii) Figure in the margin indicate full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data missing.

SECTION-A

Q.1 Analyze the frame shown in figure below using cantilever method. Draw SFD and BMD for all the members. Areas of columns are shown at the top of each column. 11.67

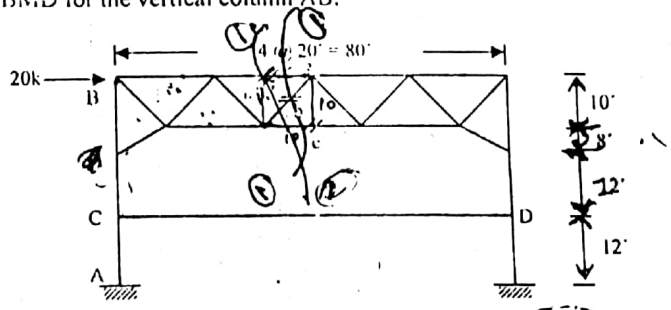


Q.2 Find all the joint moments by moment distribution method. Support B settle by 0.2 inch and support A rotates by 0.002 radian clockwise. Draw BMD of the beam. Use $E=30\times10^6$ psi and $I=1000$ in^4. 11.67

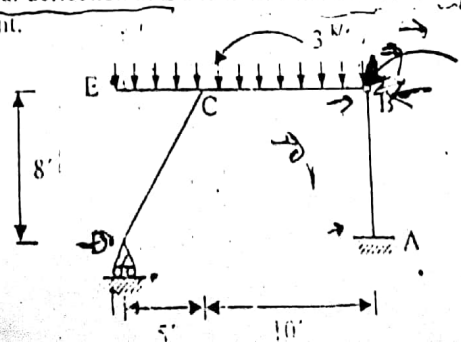


Q.3 (a) State the assumptions made for analyzing the building frame due to vertical load. 2.67

(b) Determine the stresses in the member a, b and c of the portal frame shown in figure below. Also draw SFD & BMD for the vertical column AB. 9.00

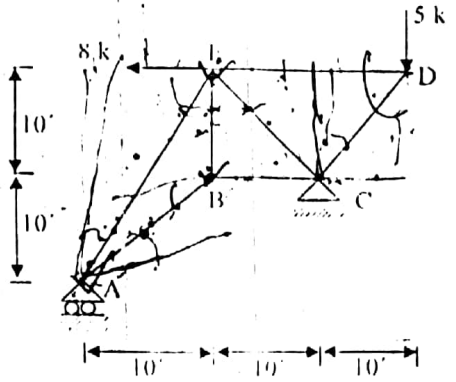


Q.4 Calculate the vertical deflection at E and horizontal deflection at B & D of the frame shown in figure below. EI is constant. 11.67

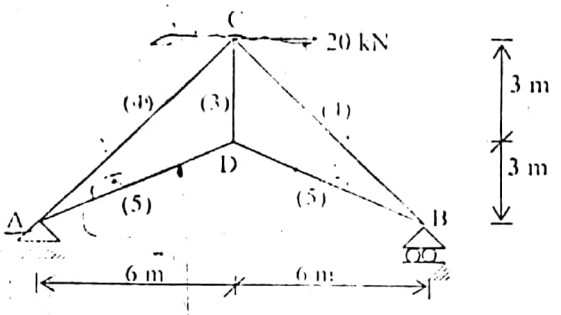


SECTION-B

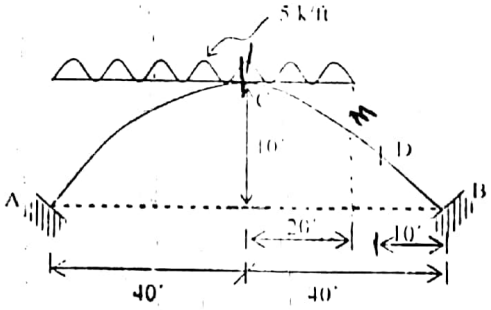
Q.8 Determine vertical deflection at joint B and rotational deflection of member BC of the truss as caused by the applied load shown in fig. below. Cross-section of each member is 1.5 in^2, E=30×10^3 ksi. 11.67



Q.9 By the unit load method, determine the horizontal deflection at support B and vertical deflection at D due to the applied load shown in figure below. Numbers in parentheses are areas in $\times 10^{-4}$ m^2. E=200 · 10^6 kN/m^2. 11.67

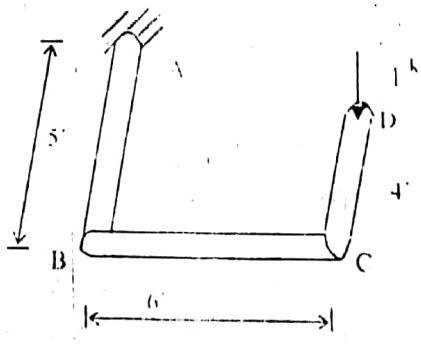


Q.10 Determine the position and magnitude of maximum bending for the parabolic arch shown below. Also find out the shear force and normal thrust of section 10 ft from right support. Neglect the rib shortening. 11.67



Q.11 The standard pipe bracket shown in figure below having 90° angle at B and C and located in horizoatal plane. Find (a) vertical deflection of D (b) rotational deflection of D in the plane normal to the axis of CD. [I=10 in^4, G=12000 ksi, E=30000 ksi] 11.67

J = 19.96 in4



CE-09

Heaven's Light is Our Guide

DEPARTMENT OF CIVIL ENGINEERING

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

B.Sc. Engineering **THIRD** year **SIXTH SEMESTER** Examination, 2010

CE 313

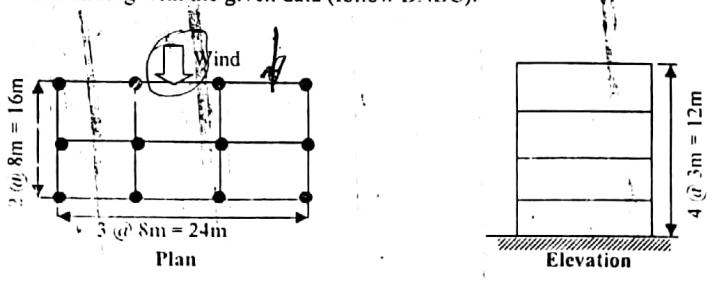
Structural Analysis & Design - II

Full Marks: 70 **Time: 3 Hours**

N.B.:
(i) Answer SIX questions, taking THREE from each section.
(ii) Figure in the margin indicates full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data missing

SECTION-A

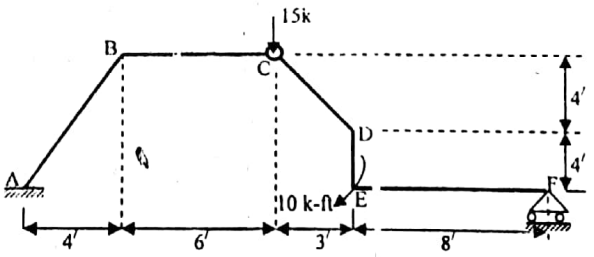
Q.1 Calculate the earthquake load and design wind pressure at each floor level for the following four storied building with the given data (follow BNBC). 11.67



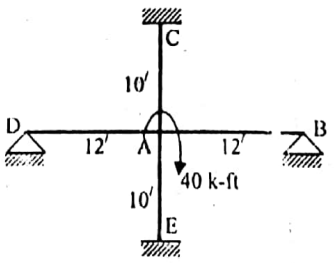
Seismic zone coefficient = 0.075; Structure importance coefficient = 1.00; Response modification coefficient = 8.00; Structure type coefficient = 0.049; Site coefficient for soil characteristics = 1.50; Seismic dead load =1500 kN/floor; Velocity to pressure conversion coefficient = 47×10^{-6}; Basic wind speed = 165 km/h and pressure coefficient = 1.80.

z (meters)	Coefficient, C_z	Coefficient, G_h
0 - 4.5	0.801	1.321
6.0	0.866	1.294
9.0	0.972	1.258
12.0	1.055	1.233

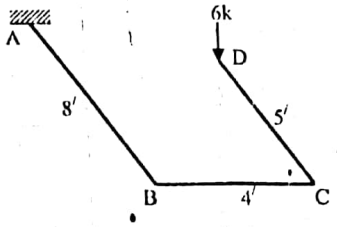
Q.2 Calculate the vertical deflection at 'C' and horizontal deflection at 'F' of the frame shown in figure below. *EI* is constant. 11.67



Q.3 A rigid frame is shown in figure below. The support C rotates by 0.002 radian clockwise. Using moment distribution method analyze the frame and draw BMD. $I = 200$ in^4, and $E = 30{,}000$ ksi. 11.67

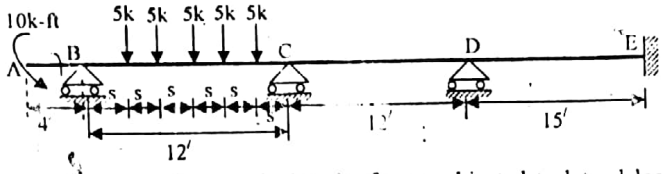


Q.4 Given a standard pipe bracket hanging at 90° angle at B and C located in a horizontal plane. Find the vertical deflection component and rotational deflection component of D in the axis of CD. $I = 40$ in^4, $G = 12 \times 10^6$ psi and $E = 30 \times 10^6$ psi. 11.67



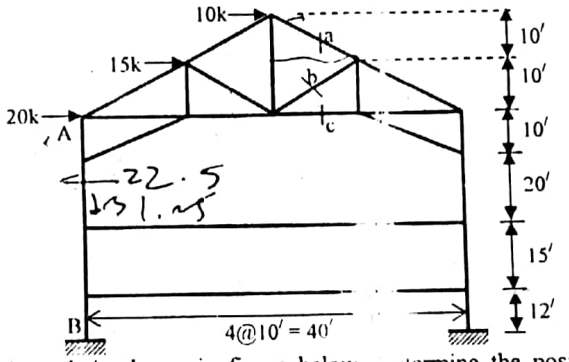
SECTION-B

Q.5 For the beam shown in figure below find all joint moments using moment distribution method. The support D settles by 0.15 inch. Draw SFD and BMD for the beam. $E = 30{,}000$ ksi, $I = 200$ in^4. 11.67

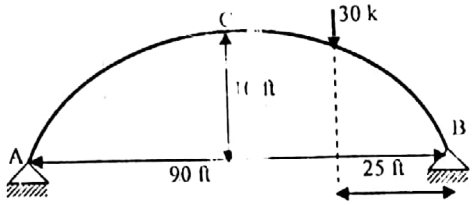


Q.6(a) What are the assumptions made for analyzing the frame subjected to lateral loads by portal method? 2.67

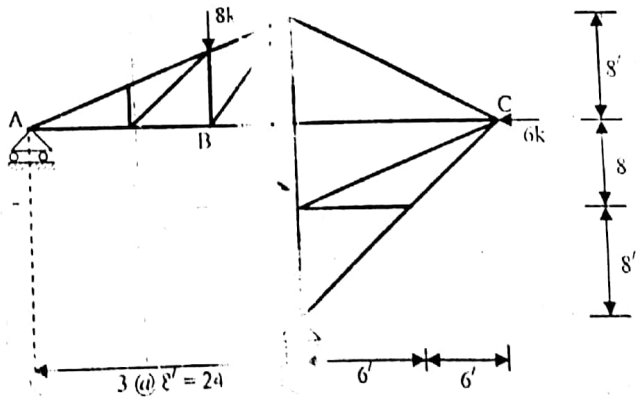
(b) A portal frame is shown in figure below. Determine the stresses in members a, b and c. Also draw shear force and bending moment diagrams for the member AB. 9.00



Q.7 A parabolic arch is shown in figure below. Determine the position and magnitude of the maximum bending moment. Also find out the shear force and normal thrust at 20 ft from each supports. Neglect the effect of rib shortening. 11.67



Q.8 Determine vertical displacement at the joint B and horizontal movement of support A of the truss as caused by the applied loads shown in the figure below. Cross-section of each member is 1.5 in^2, $E = 30 \times 10^6$ psi. 11.67



Heaven's Light is Our Guide

DEPARTMENT OF CIVIL ENGINEERING

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

B.Sc. Engineering THIRD year SIXTH Semester Examination, 2008

CE 313

Structural Analysis & Design -II

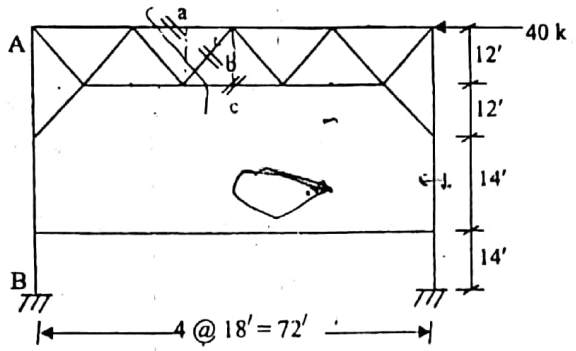
Full marks: 70 **Time: 3 Hours**

N.B:- (i) Answer any SIX questions, taking THREE from each section.
(ii) Figure in the margin indicate full marks.
(iii) Use separate answer script for each section.
(iv) Assume reasonable value for any data missing.

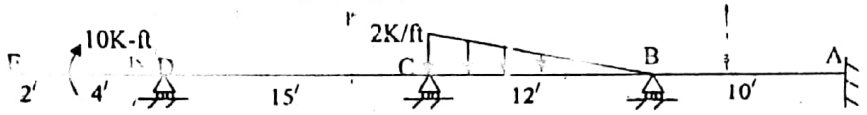
SECTION-A

Q.1.(a) State the assumptions made for analyzing the frames due to lateral loads by cantilever method. 2.67

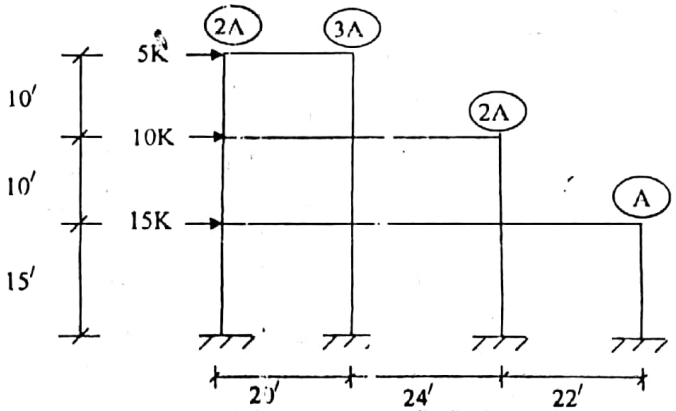
(b) Determine the stresses in the members *a*, *b*, and *c* of the portal frame shown in the figure below. Also draw *SF* and *BM* for vertical column AB. 9.00



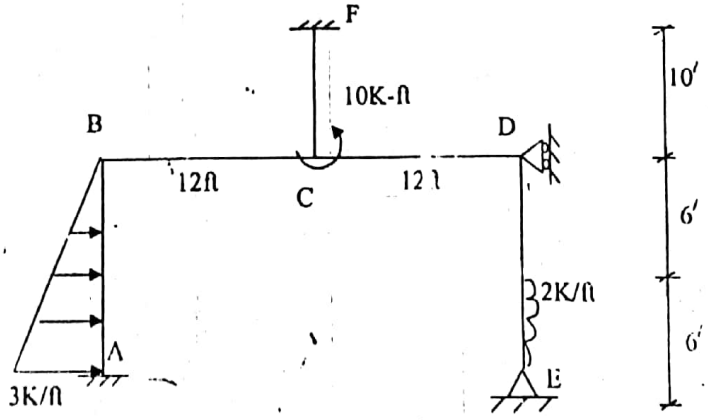
Q.2 For the beam shown in figure below, find all joint momen's using moment distribution method. The supports A rotates by 0.0025 radian clockwise and support B settles by 0.15 inch. Draw BMD for the beam. Use E=30 x 10^3 ksi and I=250 $inch^4$. 11.67



Q.3 Analyze the building frame shown in figure below by cantilever method. Also draw SFD and BMD for all the members. Cross-section areas of columns are shown at the top of each column. 11.67

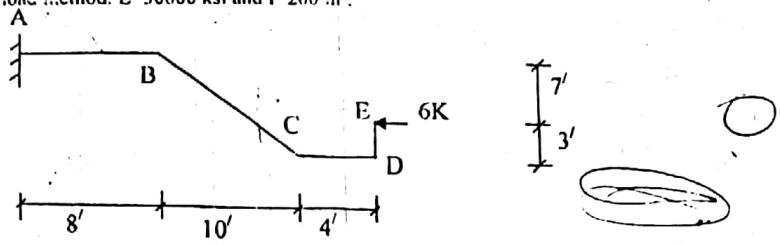


Q.4 Analyze the frame shown in figure below by moment distribution method. Draw BMD and deflected shape for the frame. EI is constant. 11.67

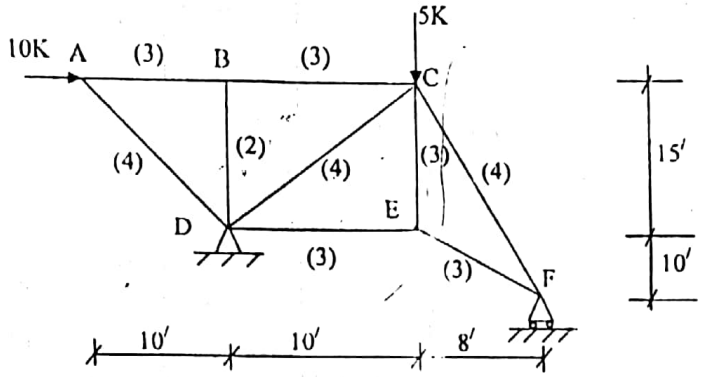


SECTION-B

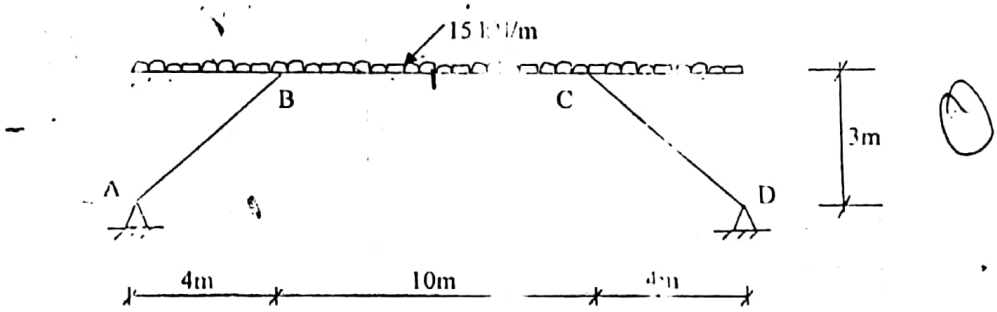
Q.5 Find the vertical, horizontal and rotational deflection components of point E as shown figure below using unit load method. E=30000 ksi and I=200 in^4. 11.67



Q.6 Find the displacements of the joint A and horizontal movement of joint F of the truss shown in figure below. Area of each member in inch-square is also shown in the parenthesis. E=30x10^6 psi. 11.67



Q.7 Two hinged arch of the form shown in figure below has constant section throughout. Determine the horizontal thrust, neglecting the effect of rib shortening. Draw SF and BM diagram. 11.67



Q.8 A standard pipe bracket is shown in figure below having a 90^0 angle at BC. Find the vertical deflection component of D and the rotation of end D of segment D about the axis of CD. Use I=10 in^4, G=12000 ksi, E=30000 ksi. 11.67