SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR
APPLIED MECHANICS DEPARTMENT

Assignment No: 01

Date: 02/08/2018

ENERGY PRINCIPLES

Sub Code 2150608 **Title of Subject** STRUCTURAL ANALYSIS - II

#	Questions
	CASTIGLIANO'S FIRST THEOREM
1	State and explain Castigliano's first theorem.
2	Determine the vertical deflection at free end in the overhanging beam as shown in ***Figure – 1***. Assume constant EI. Use Castigliano's method.
3	Determine the rotation at the free end of the beam shown in ***Figure – 2*** by Castiglione's theorem. EI = 2 X 10^{13} Nmm^2.
4	Determine the vertical and horizontal deflection at free end for ***Figure – 3***, Take EI is constant.
5	Determine the Θ_A, Θ_B, δ_C, δ_D for a beam shown in ***Figure – 4***. Take EI = 10 X 10^{13} Nmm^2.

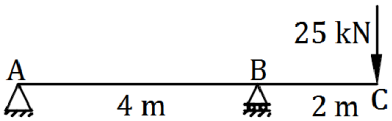

Figure- 1

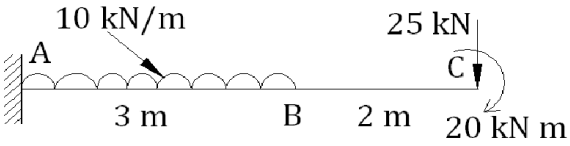

Figure- 2

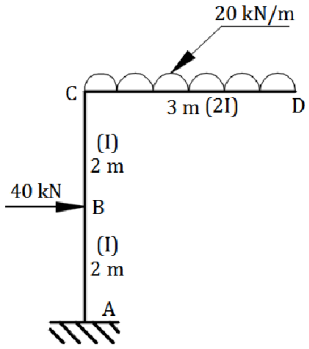

Figure- 3

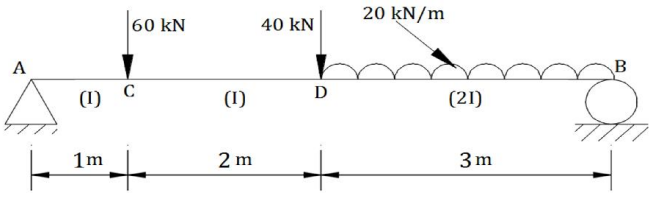

Figure- 4

Date of Submission (A – Division)	**07/08/2018**
Date of Submission (B – Division)	**08/08/2018**

SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR
APPLIED MECHANICS DEPARTMENT

Assignment No: 02

Date: 02/08/2018

ENERGY PRINCIPLES

Sub Code 2150608 **Title of Subject** STRUCTURAL ANALYSIS - II

#	Questions
	CASTIGLIANO'S SECOND THEOREM
1	For continuous beam ABC as shown in ***Figure – 1***, determine support reactions with the use of Castigliano's theorem.
2	Determine reactions at supports and draw SF & BM diagrams for a beam shown in ***Figure – 2***.
3	Analyse the Portal frame shown in ***Figure – 3*** by Castigliano's Second Theorem method.
	UNIT LOAD METHOD
1	Using unit load method, find horizontal and vertical displacement at D of frame as shown in ***Figure –4***. Take E = 2 × 10^5 N/mm2and I = 2 X 10^8 mm^4
2	Calculate the vertical displacement at free end C for the cantilever bent as shown in the ***Figure –5***.

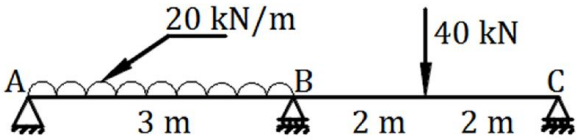

Figure- 1

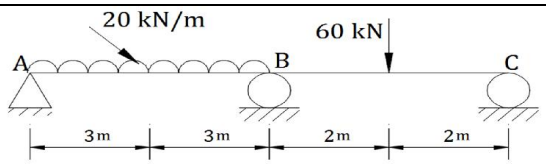

Figure- 2

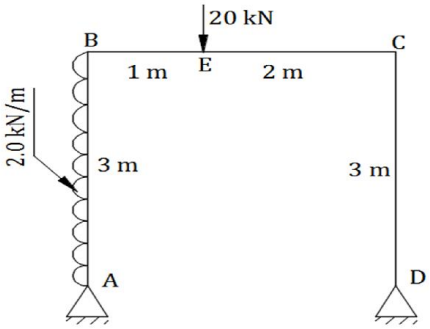

Figure- 3

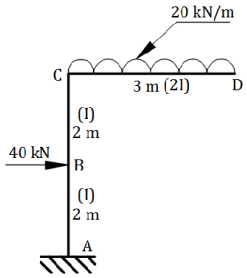

Figure- 4

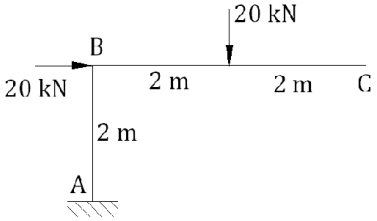

Figure – 5

Date of Submission (A – Division)	**24/08/2018**	**Date of Submission (B – Division)**	**23/08/2018**

Assignment No:	**03**	**SLOPE DEFLECTION METHOD**	
Date:	**02/08/2018**		
Sub Code	**2150608**	**Title of Subject**	**Structural Analysis - II**

#	Questions
1	Using slope deflection method analysis the beam as shown in ***FIGURE – 1***. Draw SFD and BMD both.
2	Analyze the beam shown in ***FIGURE – 2*** by slope deflection method and find unknown slopes at Joint B and C. Joint B sinks by 10 mm. E = 2 X 10^5 MPa and I = 16 X 10^7 mm^4.
3	Determine the support moments using slope deflection method for the frame as shown in ***FIGURE – 3***. Also draw Bending Moment diagram.
4	A beam AB of uniform section of span 8 m and constant EI = 4.0 X 10^4 Nm^2 is partially fixed at ends when the beam carries a point load of 100 kN at distance of 4 m from the left end A. The following displacements were observed. (i) Rotation at A = 0.015 rad (clockwise) and settlement at A = 15 mm (ii) Rotation at B = 0.0080 rad (anticlockwise) and settlement at B = 20 mm Analyse using Slope Deflection Method.

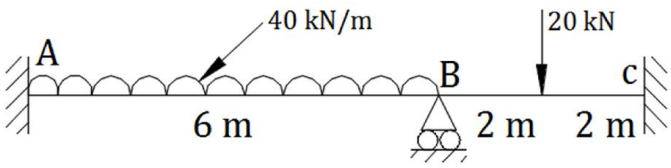

FIGURE – 1

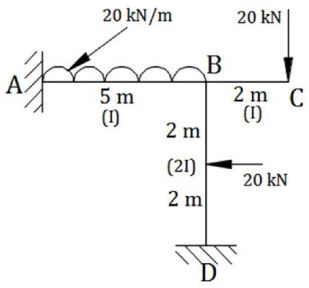

FIGURE – 3

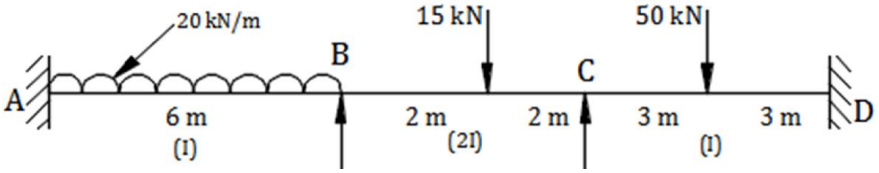

FIGURE – 2

Date of Submission (A – Division)	**07/08/2018**	**Date of Submission (B – Division)**	**08/08/2018**

Assignment No:	**04**	**INFLUENCE LINES FOR DETERMINATE STRUCTURE**	
Date:	**02/08/2017**		
Sub Code	**2150608**	**Title of Subject**	**Structural Analysis - II**

#	Questions
1	State the Importance of the Influence Lines. Give the Difference between Influence Line Diagram and Shear Force & Bending Moment Diagrams
2	A simply supported beam AB has a span of 8 m. Draw influence lines for R_A, R_B, V_X & M_X for a section 3 m from left end support
3	A train of loads as shown in ***Figure – 1*** crosses a simply supported girder of span 18 m from left to right. Calculate maximum SF & BM at section 8 m from left.
4	Draw the influence line diagram for the beam shown in ***Figure – 2***, (i) the reaction at A, (ii) the reaction at C, (iii) the shear at B.
5	Two wheel loads of 16 kN & 8 kN at a fixed distance apart of 2 m, cross a beam of 10 m span. Draw the influence line for B.M & S.F for a point 4 m from the left abutment & find the maximum B.M & S.F at that point.

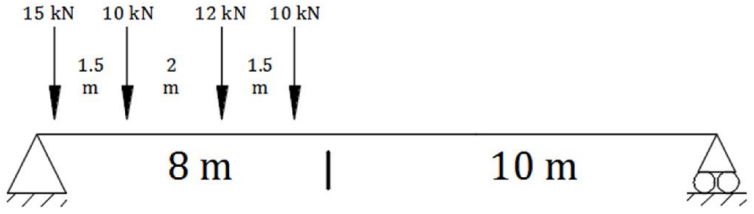

FIGURE – 1

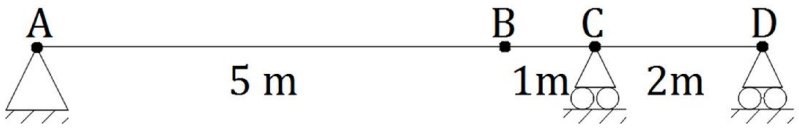

FIGURE – 2

Date of Submission (A – Division)	**24/08/2018**	**Date of Submission (B – Division)**	**23/08/2018**