Form A: Paper –Setting Blank

Ref No. –Ex/CE/T/215/2018

B.C.E. 2ND YEAR 1ST SEMESTER 2018

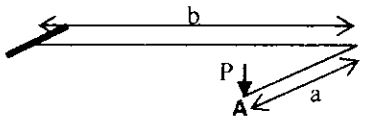
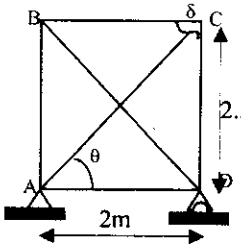
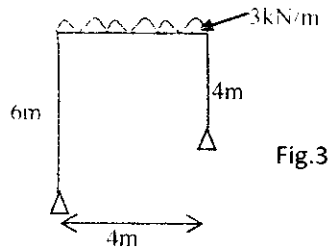
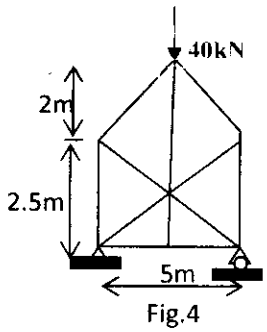
(1st / 2nd Semester ~~/ Repeat / Supplementary / Annual / Bianual~~)

SUBJECT: *Structural Mechanics-II*

Time: ~~Two hours~~/Three hours/~~Four hours/ Six hours~~

Full Marks 100
(60 marks for part-II)

Use a separate Answer-Script for each part

No. of Q.	PART – I	
	Answer **any THREE**	
1.a)	State and prove Castigliano's theorem.	
b)	Find the vertical deflection at A of the structure shown in Fig. 1. Assume flexural rigidity EI and torsional rigidity GJ to be constant for the structure.  Fig.1  Fig.2	8+8+4= 20
c)	What will be the instantaneous deflection of an axial member fixed at base, subjected to an impact load **P** from a height **h**?	
2.a)	Find the forces in each member of the truss as shown in Fig. 2. Member AC is found to be 1.4 mm short of required length. The diagonal members are each 900mm^2 and remaining members are 1200mm^2 in area. Take E = 200kN/mm^2.  Fig.3  Fig.4	10+10= 20
b)	Analyze the portal frame as shown in fig. 3 and draw bending moment diagram. Apply strain energy method.	
3.a)	Find the fixed end moments and draw the SFD and BMD for a *fixed beam* subjected to TWO point load P_1 and P_2 at a distance l_1 and l_2 respectively from left end.	12
b)	A Three Hinged Parabolic arch with span 10m, rise 3.0m is subjected to udl of 2KN/m for half the span at right. Find the horizontal and vertical reactions. Also find the bending moment at a distance 2m from left end.	8
4.a)	Solve the Complex truss as in Fig.4 by Henneberg's bar exchange method.	15
b)	Find the rotation angle θ_A at A when a simply supported beam AB of length L and constant EI is subjected to an external moment M_0 at end A. Use strain energy method.	5

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Ref. No. ...*EX/CE/T/215/2018*

.....*B. Civil Engineering 2nd Year*... EXAMINATION, *2018*
(1st / 2nd Semester / ~~Repeat / Supplementary / Annual / Bi-Annual~~)

SUBJECT ...*Structural Mechanics-II*
(Name in full)

PAPER .....*XX*.....

Full Marks 100
(40 marks for part II)

Time: ~~Two hours~~/Three hours/~~Four hours/Six hours~~

Use a separate Answer-Script for each part

No. of Questions	PART II	Marks
	Answer question no. 1 and any two from the rest.	
1.	Find the slope and deflection at point *B* of given beams (Fig. 1) by **Conjugate Beam Method**. Given, I=8603.6 × 10^4 mm^4 and E=2 × 10^5 N/mm^2	12
2.	Determine the force in each member of the truss shown in Fig. 2. All members have the same cross-sectional area.	14
3.	Find the slope and deflection at points *B* and *D* of given beam (Fig. 3) by **Moment Area Method**.	14

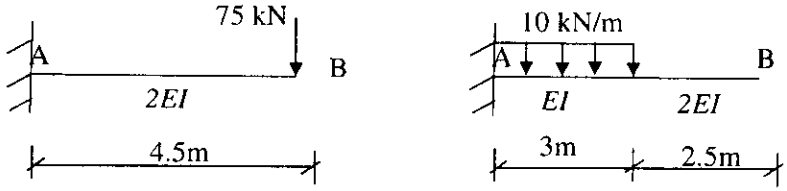


Fig. 1

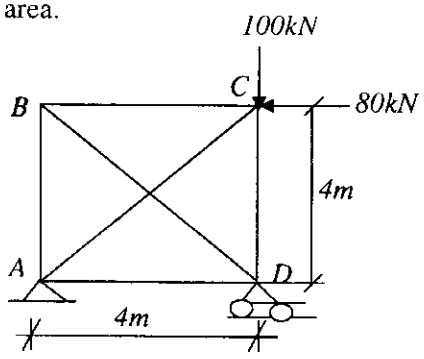


Fig.2

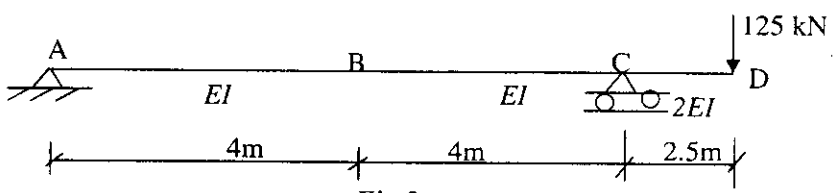
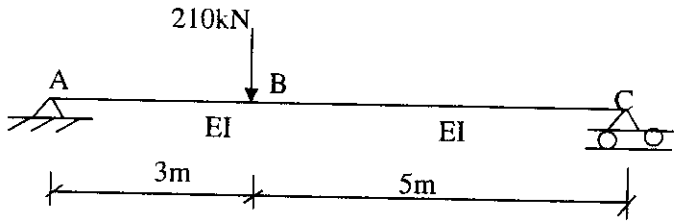


Fig.3

Full Marks 100
arks for part II)

	Marks
m	12
	14
	14

4.	Evaluate the slope and deflection at point *B* of given beam (Fig. 4). **Use Double Integration Method**.  ***Fig.4***	14