Form A: Paper –Setting Blank Ref No. –Ex/CE/T/215/2019

B.E. CIVIL ENGINEERING

SECOND YEAR FIRST SEMESTER EXAM 2019

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

SUBJECT: *Structural Mechanics-II*

(Name in full)

Time: ~~Two hours~~/Three hours/~~Four hours/ Six hours~~ Full Marks 100

(60 marks for part I)

Use a separate Answer-Script for each part

No. of Question	PART – I	
1.a)	What is strain energy? Derive the expression for strain energy due to Torsion.	2+5
b)	Find the elastic strain energy due to SHEAR of the simply supported beam (with length L) carrying udl W per unit length and a concentrated load P at one-third of its length. Take EI constant.	5
2.a)	Find the forces in each member of the truss as shown in Fig. 1. Member BD is found to be 2.0mm short of required length. The diagonal members are each 800mm^2 and remaining members are 1000mm^2 in area. Take E = 200kN/mm^2.	10
	OR	
2.a)	Find the deflection and slope at free end of a cantilever beam of length L carrying udl W per unit length. Use Strain energy principle.	6
b)	What is static and kinematic indeterminacy? Find the static and kinematic indeterminacies of the beam in Fig. 2.	4

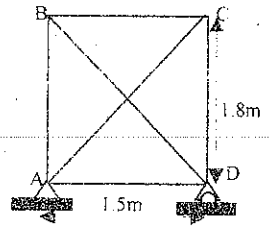


Fig.1

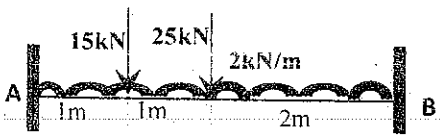


Fig.2

3.	Analyze the portal frame as shown in fig. 3 and draw bending moment diagram. Apply strain energy method.	12

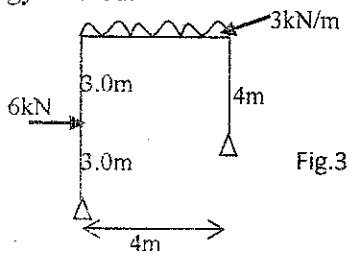


Fig.3

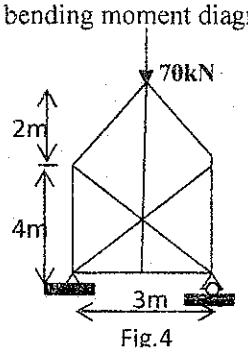


Fig.4

	OR	
	Find SFD and BMD of a fixed beam as shown in Fig. 2. Find maximum positive and negative Bending moment values.	12
4.	Draw SFD and BMD of two equal span (span length = L) continuous beam carrying udl of w per unit length over the two span.	12
	OR	

4.a)	Define Arch? How it is different from a beam?	2
b)	A Three Hinged Parabolic arch with span 9m, rise 3.8m is subjected to udl of 2KN/m for half the span. Find the horizontal and vertical reactions. Also find the bending moment at a distance 3m from one end.	10
5.	Solve the Complex truss as in **Fig.4** by Henneberg's bar exchange method.	14

Form A : Paper-setting Blank

Ref. No. ...*EX/CE/T/215/2019*

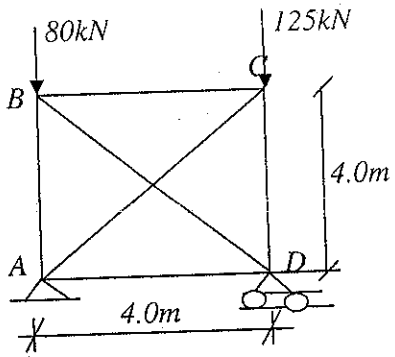
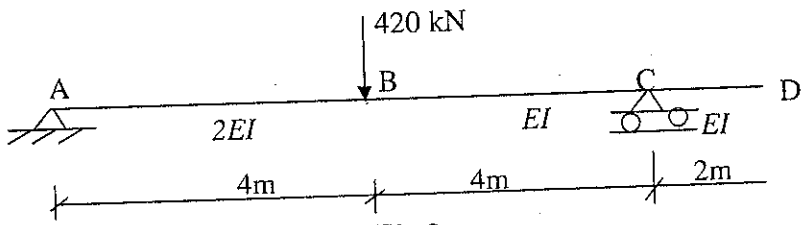
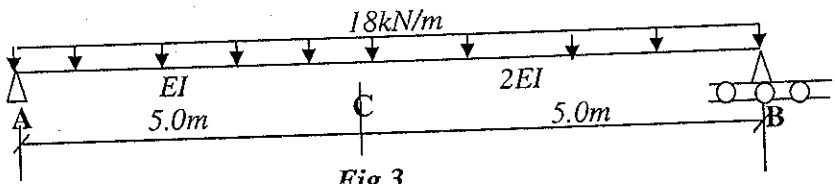
.....*B. E. Civil Engineering 2nd Year*... EXAMINATION, *2019*
(1st / 2nd Semester / ~~Repeat / Supplementary / Annual / Bi-Annual~~)

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 **Answer question no. 1 and any two from the rest.**	Marks
1.	State and prove the First and Second Moment area theorems.	12
2.	Determine the force in each member of the truss shown in Fig. 1. All members have same cross-sectional area.  ***Fig.1***	14
3.	Find slope and deflection at points B and D of given beam (Fig. 2) by **Conjugate Beam Method**. Given, $I=8603.6 \times 104\ mm^4$ and $E=2 \times 105\ N/mm^2$.  ***Fig.2***	14
4.	Determine slope and deflection at point *C* of the given beam (Fig. 3). **Use Double Integration Method.**  ***Fig.3***	14