Ref. No. : Ex/CE/5/T/207/2018 (Old)

Name of the Examinations: B.E. CIVIL ENGINEERING (PART TIME) SECOND YEAR SECOND SEMESTER (Old) – 2018

Subject : THEORY OF STRUCTURES-AI | Time : Three hours | Full Marks : 100

Part I

Instructions : Use Separate Answer scripts for each Part

1 a) Obtain the expression for critical buckling load for a column with one end fixed and the other end hinged using moment equilibrium equation. (15)

b) Calculate the buckling load of a compression member of length 4 m having both ends fixed. Cross section of the member is a I – section having flange 200 mm x 20 mm and web 300 mm x 15 mm. E = 200 GPa. (10)

2. a) State Muller – Breslau's principle for obtaining the ILD for a function of a beam. Prove the principle using 'Principle of Virtual work'. (05)

b) A train of wheel load is moving from left to right through a simply supported girder AB as shown in Figure 1. Find out (i) Maximum bending moment at 'C' (ii) Maximum positive shear force at 'C' (iii) Absolute maximum bending moment (iv) Absolute maximum shear force. (20)

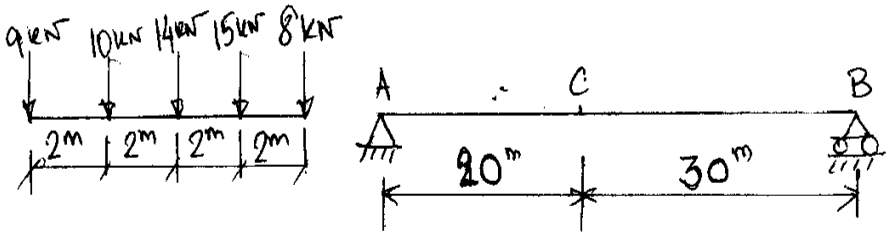


Figure 1

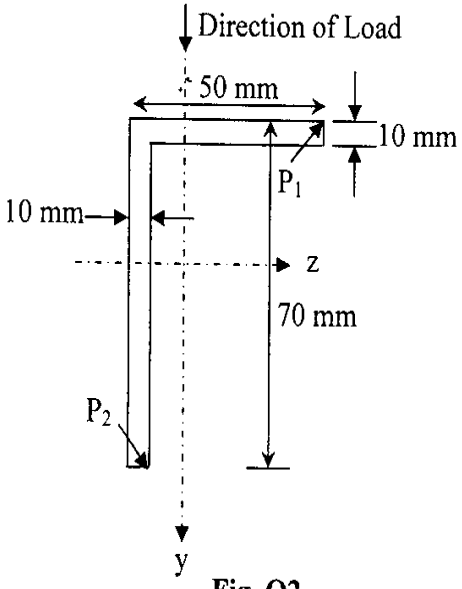
.....*B.E. Civil Engineering (Evening) 2nd Year 2nd Semester [OLD]*..... EXAMINATION, *201*

SUBJECT .....*Theory of Structures - AI*.....

Full Mark
(50 marks for each p

Time: **Three hours**

Use a separate Answer-Script for each part

No. of Questions	PART II	M
	Answer ANY TWO questions	
1.	a) Derive the expression to find the deflection at any location along the span and the expression of bending stress at any point on the cross-section of a beam subjected to unsymmetrical bending. b) State 'theorem of three moments' and prove it.	[15 =
2.	A simply supported beam over a span of **1.5m** is carrying a **concentrated load** of magnitude **10N** acting vertically downward at the mid-span of the beam. The **angle-shaped cross-section** of the beam (shown in Fig.Q2) has the following dimensions: width = 50mm., depth = 70mm., thickness of flange and web = 10mm. Calculate i) the angle of inclination of principal axes and principal moments of inertia ii) the net vertical and horizontal deflections of the beam at mid-span if $E = 2x10^5$ N/mm^2 and iii) the stress developed at points P_1 and P_2 (shown in Fig.1) of the cross-section at mid-span..  **Fig. Q2**	[2

(Contd. to page 2)

..... ***B.E. Civil Engineering (Evening) 2nd Year 2nd Semester [OLD]*** ..... EXAMINATION, ***2018***

SUBJECT .....***Theory of Structures - AI***.....

Three hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

ons	**PART II**	Marks
	(*Contd. from page 1*)	
3.	Analyse the continuous beam ABC as shown in Fig.Q3 by using '**Three Moment Theorem**' and calculate the support reactions. Also draw the bending moment diagram and shear force diagram for this beam.	[25]

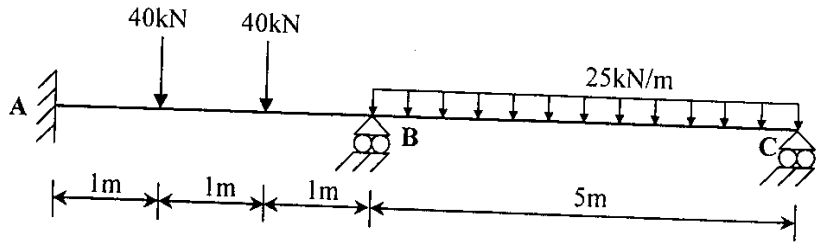


Fig.Q3

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