BACHELOR OF CIVIL ENGINEERING EXAMINATION, 2018

(2nd Year, 2nd Semester, Evening)

Theory of Structures - I

Time : Three hours

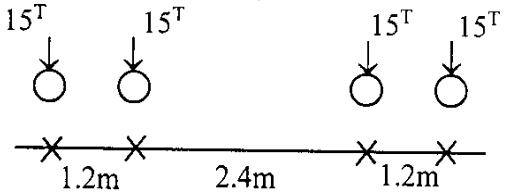
Full Marks : 100

Use a separate Answer Script for each part.

PART - I (50 marks)

Answer ***all*** questions.

1. (a) Determine the maximum bending moment and maximum support reaction of a simply supported beam of 10m span subject to the following moving loads. Consider an impact factor of 1.25 with the final moment and reaction and write down the design forces. 20



(b) Draw the Influence line diagram of bending moment and support reaction of a simply supported beam using the principles of virtual work. 5

2. (a) Find out the Euler's critical buckling load of a both end pinned column or strut. Write down the expressions of higher modes also. Among all these modes which one is the stable mode. 20

(b) What is effective length of a column or strut. Write down the expressions for critical buckling load for both end fixed column and one end fixed with other end pinned conditioned column. 5

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

SUBJECT .....*Theory of Structures - I*.....

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Full Marks
(50 marks for each p

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
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 $E = 2 \times 10^5$ 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..	[2

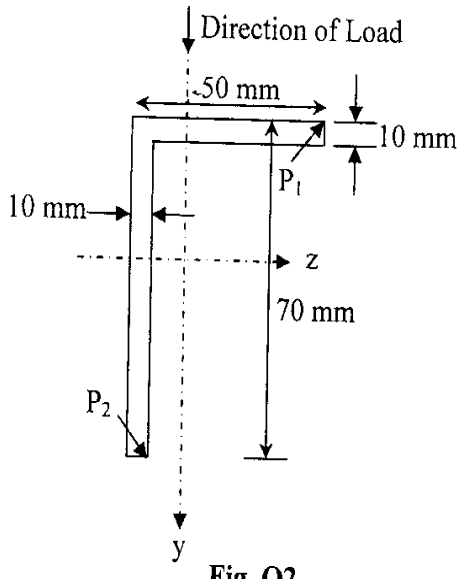

Fig. Q2

(Contd. to page 2)

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(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART II	Marks
	(Contd. from page 1)	
3.	Analyse the continuous beam ABCD 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]

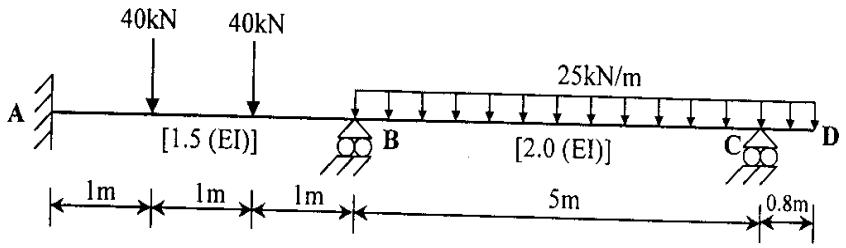

Fig.Q3

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