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Reg. No. : .....

Name : .....

Fourth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
Branch : Civil
08.403 : STRUCTURAL ANALYSIS – I

Time : 3 Hours Max. Marks : 100

PART – A

(Answer **all** questions)

1. Find the deflection at the free end of a cantilever of span *l* loaded with a point load W at a distance *l*/3 from free end.
2. Explain conjugate beam method.
3. Explain the principle of minimum total potential energy.
4. State and prove Betti's Law.
5. Show that a three hinged parabolic arch is not subjected to any bending moment at any section when it is subjected to udl over the whole span.
6. Derive Rankine's formula for columns and show that it is valid for all lengths of columns.
7. Explain equivalent uniformly distributed load and its significance.
8. What is the position of moving u.d.l. on a simple beam for maximum +ve and –ve shear at a given section ?

(8×5=40 Marks)

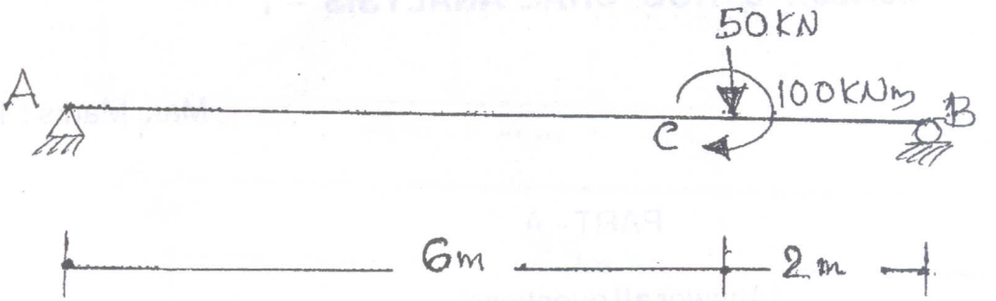
P.T.O.

PART – B

(Answer **one** question from **each** Module)

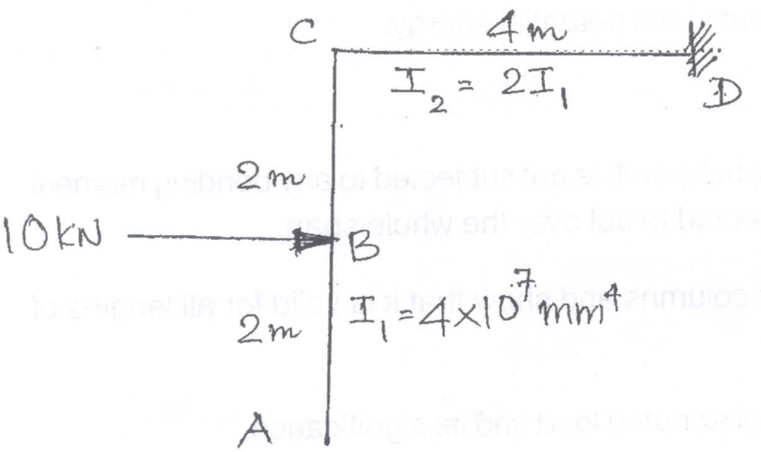
Module – 1

9. Find the slope and deflection at the loaded point C using Macaulay's method. EI = 10,000 kNm^2.



OR

10. Find the vertical deflection and rotation at free end of the frame shown below using strain energy method. E = 210 kN/mm^2.



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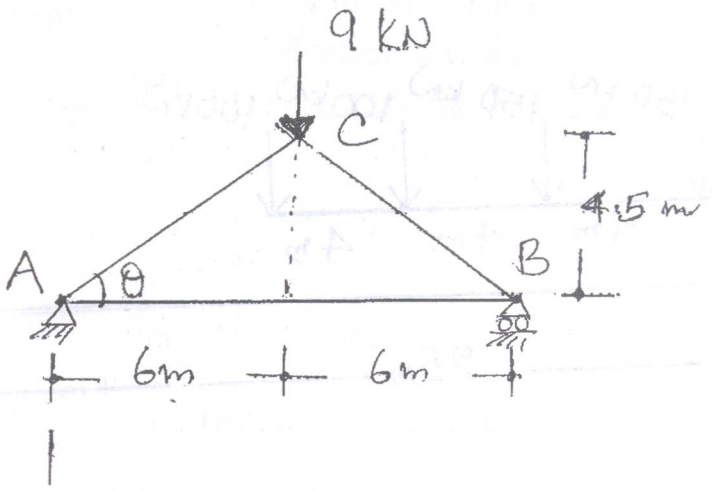
Module – 2

11. Find the horizontal and vertical displacement of joint C. E = 200 kN/mm^2. C.S. area of horizontal member is 150 mm^2 and area of inclined members is 200 mm^2 each.



OR

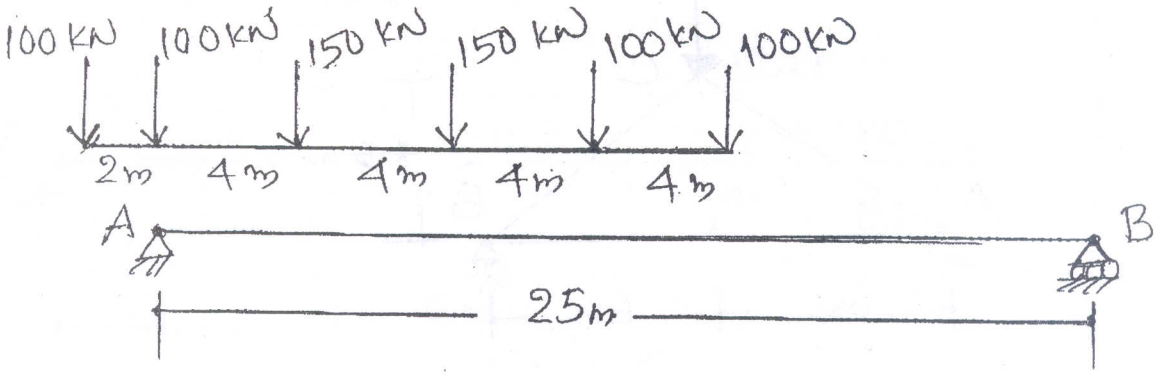
12. A three hinged circular (segmental) arch has a span of 30 m and rise 5 m. It supports a concentrated load 150 kN at 7.5 m from left support. Find (i) the reactions at supports. (ii) Max +ve BM and –ve BM. Sketch the BMD. 20

Module – 3

13. A hollow cast iron column whose outside diameter in 200 mm has a thickness 20 mm. It is 4.5 m long and fixed at both ends. Calculate the slenderness ratio. Also find the ratio of Euler's load to Rankine's critical load. Comment on the result. $f_c = 550$ N/mm^2; $\alpha = \frac{1}{1600}$; $E = 8\times10^4$ N/mm^2.

OR

14. Calculate the absolute maximum BM and its location in a 25 m span beam caused by a series of concentrated loads moving across the span as shown in figure.



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