



PROGRAM : *B-TECH*
ENGINEERING: CIVIL

SUBJECT : **THEORY OF STRUCTURES IV**

CODE : **TSI 441**

DATE : SUMMER SSA EXAMINATIONS 2014
5 DECEMBER 2014

DURATION : (SESSION 1) 08:00 – 11:00

WEIGHT : 40 : 60

TOTAL MARKS : 116

EXAMINER : MR R SUN

MODERATOR : MR G. ROBERTS

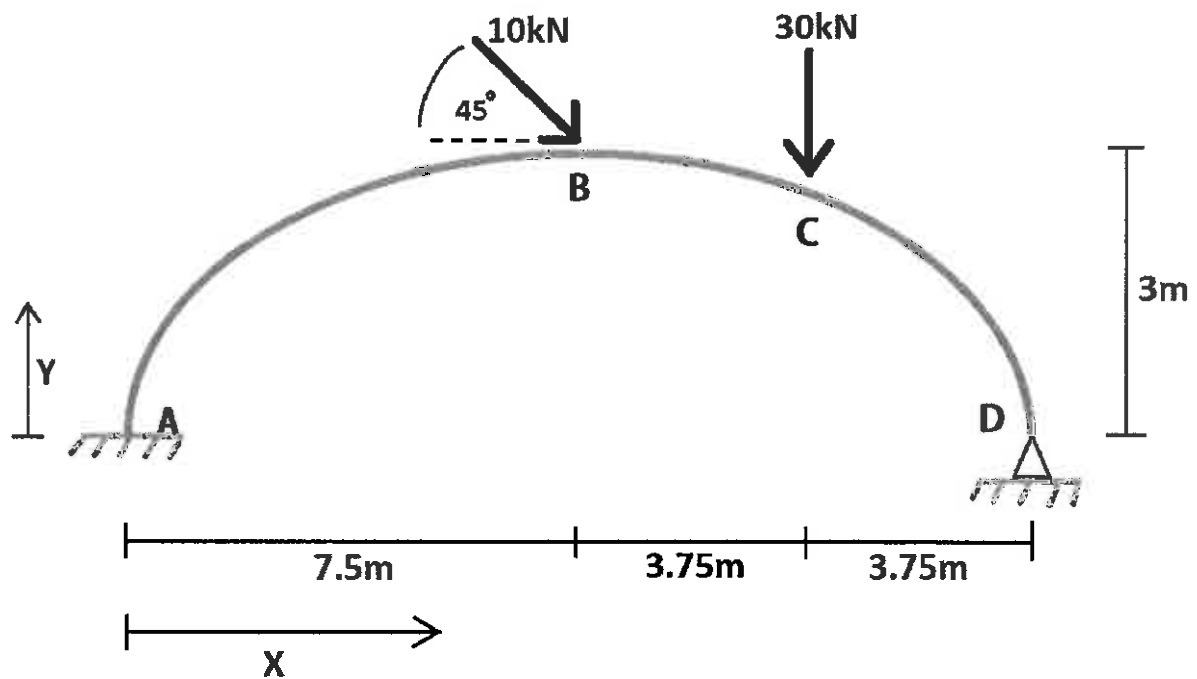
NUMBER OF PAGES : 4 PAGES

INSTRUCTIONS : THIS IS A CLOSED BOOK EXAMINATION

REQUIREMENTS : PROGRAMABLE POCKET CALCULATORS ARE ALLOWED

Question 1 (63 marks)

- 1) Calculate all the reactions for a 2 degree statically indeterminate parabolic arch applying the secant assumption (57)
- 2) Calculate the Normal Thrust and Radial Shear at 3.5m from support A (6)



Analysis Details:

Remove Reaction V_D and H_D

Work from A to B **and then** from D to B

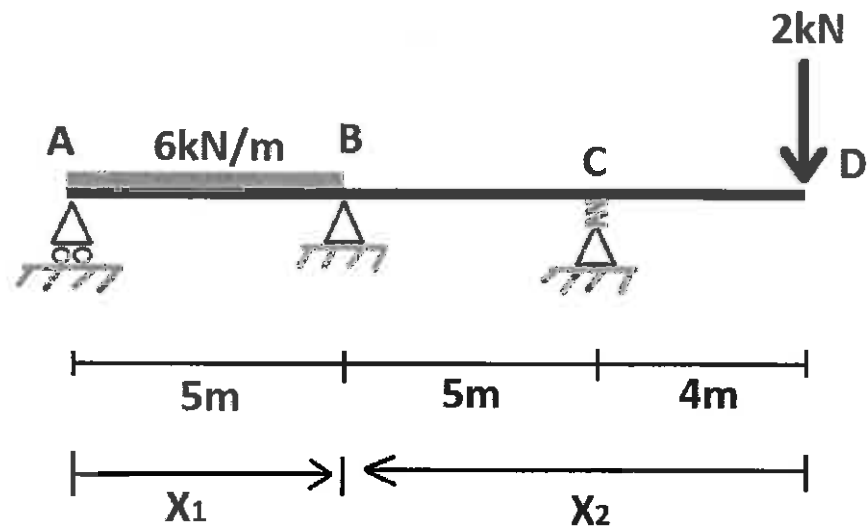
$$NB \ b = \frac{4ah}{L^2} (L - a)$$

Material Details:

EI constant

Question 2 (31 marks)

- 1) Calculate all the reactions for the single degree statically indeterminate beam shown below (31)



Analysis Details:

Remove reaction V_c

Work from A to B and then from D to B

Material Details:

$E = 250\text{ GPa}$

$I = 3.5 \times 10^{-5}\text{ m}^4$

$k = 6000\text{ kN/m}$

Question 3 (22 marks)

Using the formulation of static equations, draw the Influence Line Graphs for: (Show all calculations)

- 1) Reaction Moment at E (11)
- 2) Vertical Reaction at E (11)

