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Family Name					
Given Name/s					
Student Number					
Teaching Period	Semester 2, 2018				

ENG466 – Design of Concrete Structures	DURATION	
	Reading Time:	10 minutes
	Writing Time:	120 minutes
INSTRUCTIONS TO CANDIDATES		
<p>Answer all questions.</p> <p>If necessary, make appropriate assumptions and state your assumptions.</p>		
EXAM CONDITIONS		
<p><u>You may begin writing from the commencement of the examination session.</u> The reading time indicated above is provided as a guide only.</p>		
This is a RESTRICTED OPEN BOOK examination		
Any non-programmable calculator is permitted		
No handwritten notes are permitted		
No dictionaries are permitted		
ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED	
A Textbook and AS3600	1 x 16 Page Book 1 x Scrap Paper	

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DOUBLE-SIDED.

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SECTION A

Answer all questions in this section

Each question is worth 5 marks (Total 40 Marks)

Q.1

With the aid of sketches, explain what an interaction diagram is and how you will construct one.

Q. 2

A rectangular beam of width 250 mm and depth 400 mm has four tensile reinforcements of N20 mm diameter and cover of 30 mm arranged in one line. The characteristic strength of concrete is 20 MPa. What is the maximum shear force the section can resist without any shear reinforcement?

Q. 3.

Where does prestressed concrete become more useful than Reinforced concrete? Explain the difference in the techniques of pretension and post tension.

Q. 4

(a) What is a plastic centre?

(b) What is the difference between a braced and an unbraced column in relation to design moment?

Q. 5

A column of 7m length pinned at one end and fixed at other has a cross sectional area of $10 \times 10^4 \text{ mm}^2$ and a second moment of area of $8 \times 10^9 \text{ mm}^4$. Calculate the slenderness ratio.

Q.6

In AS3600, torsion is considered in conjunction with transverse shear. State the interaction formula to be satisfied and explain the different aspects of the formula.

Q.7

Explain the mechanism of bond resistance.

Q.8

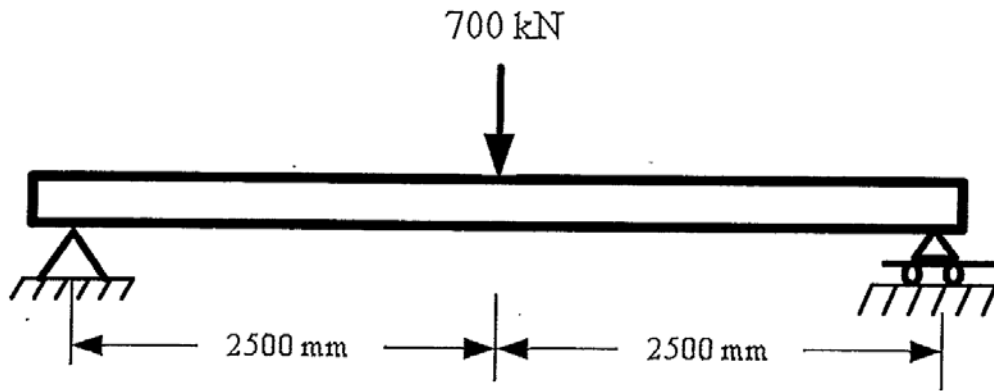
Explain the difference between a one-way slab and a two-way slab.

Answer all questions in this section.

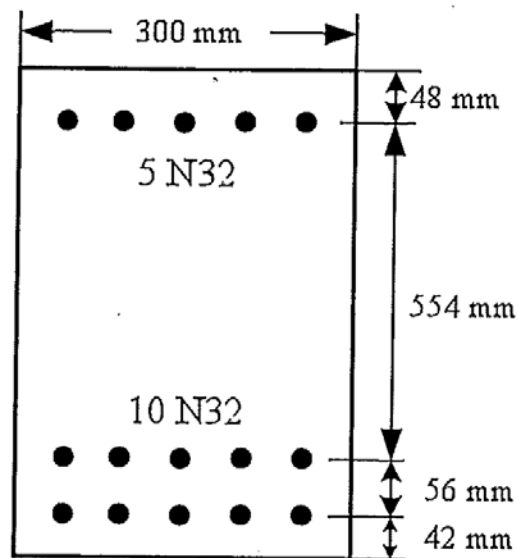
SECTION B

Q. 1 (15 Marks)

For the beam shown below design the transverse shear reinforcement. Given $f'_c = 25\text{MPa}$ and use N16 bars for closed ties.

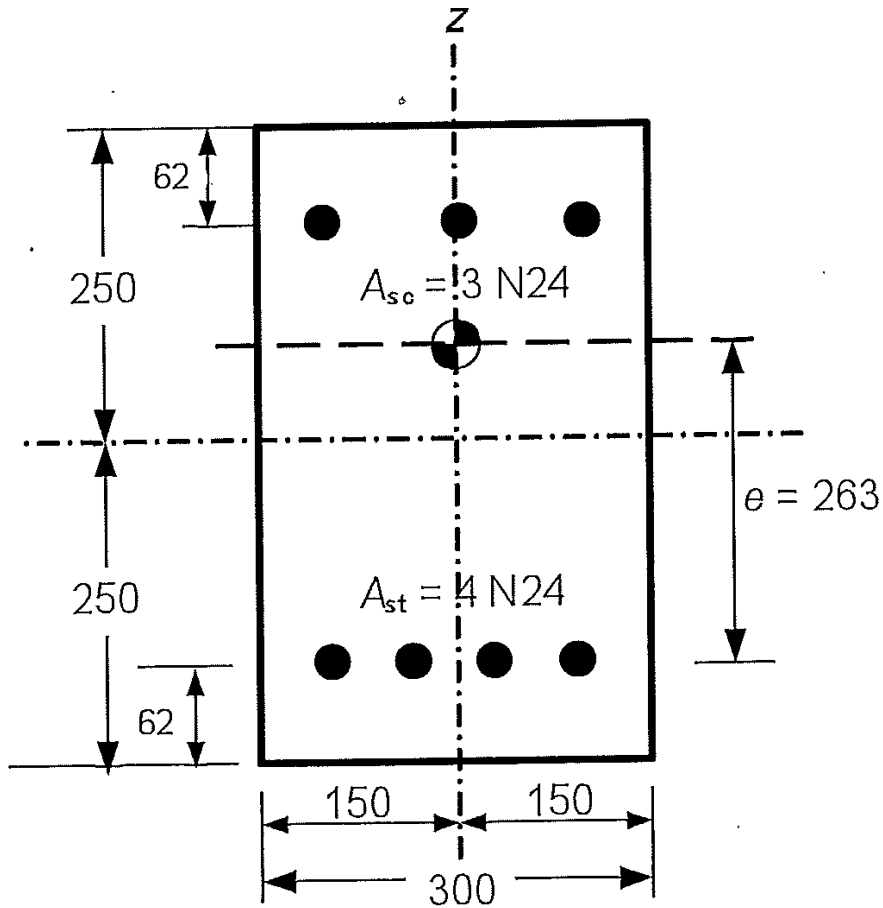


(a)



Q. 2 (15 Marks)

An asymmetrically reinforced column section is given below. The column is subjected to uniaxial loading about the X-axis. For the given eccentricity, calculate ϕN_u



(Reinforced Concrete by Yew-Chaye Loo)

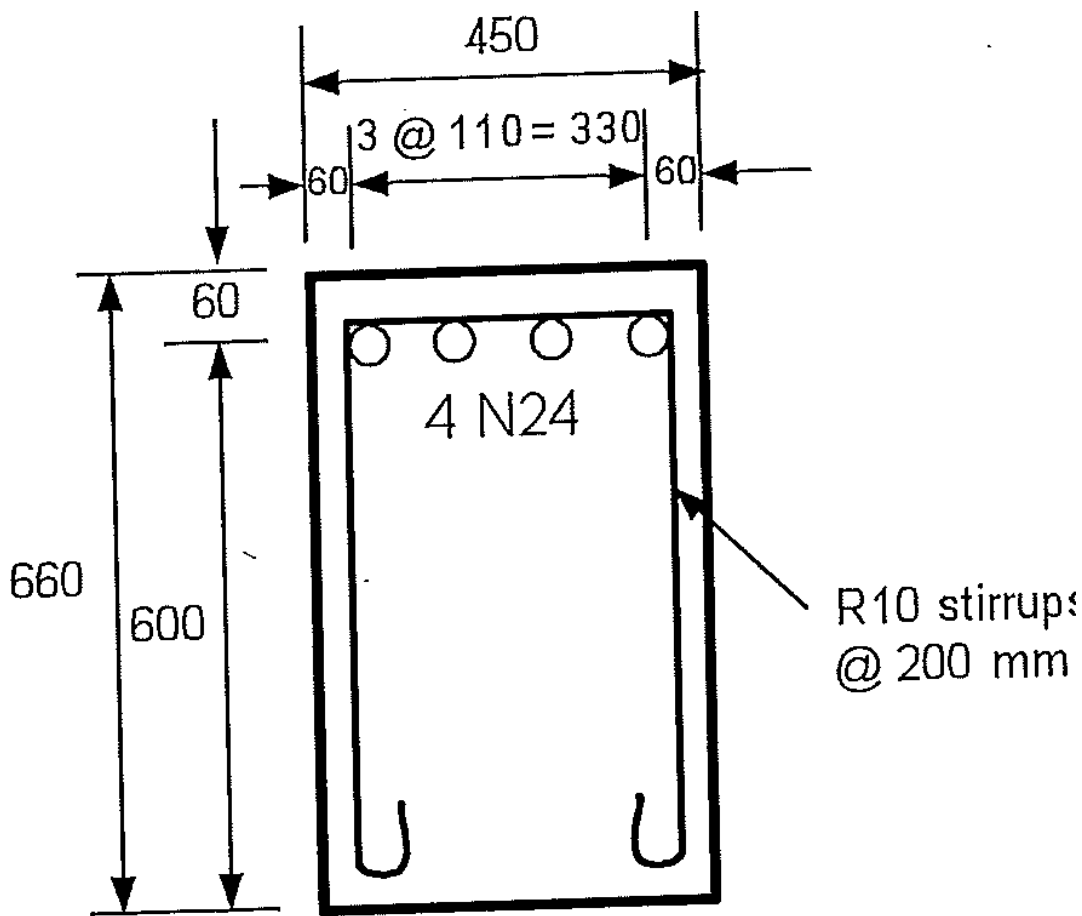
Q. 3 (15 Marks)

(a) A two-way floor system is continuous in two perpendicular directions and non-continuous in the other two perpendicular directions. Describe the method suggested in AS3600 for calculating the bending moment in both directions for a two-way slab.

(b) With the aid of diagrams, indicate all the necessary reinforcement to be found in a two-way slab.

Q. 4 (15 Marks)

Below is the cross section of a reinforced concrete cantilever beam, Calculate the development lengths for the N24 top bars in accordance with AS3600. Given $f'_c = 25$ MPa.



All Dimensions in mm. (Reinforced Concrete by Yew-Chaye Loo)

Semester 2, 2018

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