



(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(Main Campus)

UNIVERSITY MAIN EXAMINATIONS

2023/2024 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE OF

**BACHELOR OF SCIENCE IN CIVIL AND STRUCTURAL
ENGINEERING**

COURSE CODE: CSE 313

COURSE TITLE: STRUCTURAL MASONRY DESIGN

DATE: 14TH DECEMBER 2023 TIME: 8 A.M – 10 A.M

Instructions to Candidates

- This paper contains FOUR (4) questions
- Answer Question ONE and ANY TWO Questions Section B
- Design codes are allowed

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over →

CSE 313: STRUCTURAL MASONRY DESIGN

SECTION A: Answer ALL questions [30 Marks]

Question ONE

- a) State criteria which may influence the choice of a masonry structural unit selected for a particular project. **(4 marks)**
- b) What is the purpose of mortar in masonry construction? **(4 marks)**
- c) Explain why lime is sometimes used in mortar. **(4 marks)**
- d) Illustrate factors which influence the axial loadbearing capacity of masonry walls and columns. **(8 Marks)**
- e) A single leaf wall constructed from 390mm long X 190mm high X 100mm thick solid concrete blocks is built between concrete floors as shown in Figure Q1. The ultimate axial load carried by the wall, including an allowance for self-weight is 125kN per metre run. If the wall is 5m long, what block and mortar strengths are required if special manufacturing and normal construction control will apply?. **(10 Marks)**

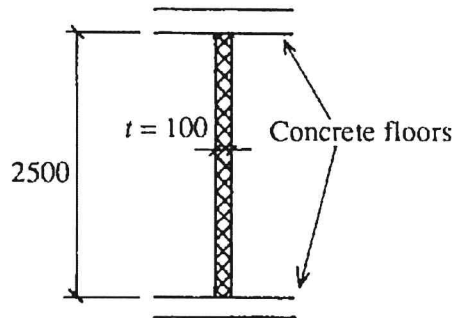


Fig Q1

SECTION B: Answer ANY TWO questions

Question Two: 15 marks

- a) The brick cavity wall shown in Figure Q2 supports an ultimate load on the inner leaf of 75kN/m, the outer leaf being unloaded. Design the wall if both manufacturing and construction control are to be normal. **(15Marks)**

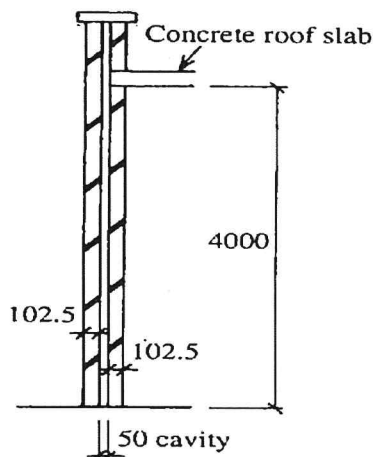


Fig Q2

Question Three: 15 marks

The cross-section of an eccentrically loaded column is shown in Fig. Q3. Using the design data given, design the column for each of the cases (i) and (ii) indicated. **(15Marks)**

Design data:

Dead load	100kN
Imposed load	50kN
Category of manufacturing control	special
Category of construction control	normal
Structural unit	standard format bricks

Effective height about the y-y axis ($h_{ef\ yy}$)	2500 mm
Effective height about the x-x axis ($h_{ef\ xx}$)	5000 mm

Case	e_{xx} (mm)	e_{yy} (mm)
(i)	15.0	8.0
(ii)	20.0	25.0

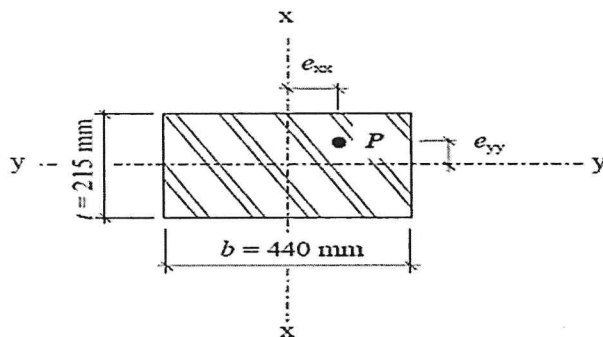


Fig Q3

Question Four: 15 marks

A two-storey steel-framed building is to be clad in wall comprising 102.5 mm thick brickwork, as shown in Fig. Q4. Using the design data given, design Panel B. Assume the panel to be continuous on all the four sides. **(15Marks)**

Design Data

Characteristic wind pressure, ($W_{k,r}$)	0.8 kN m ²
masonry unit manufacturing category	Normal
Construction control category is	Special

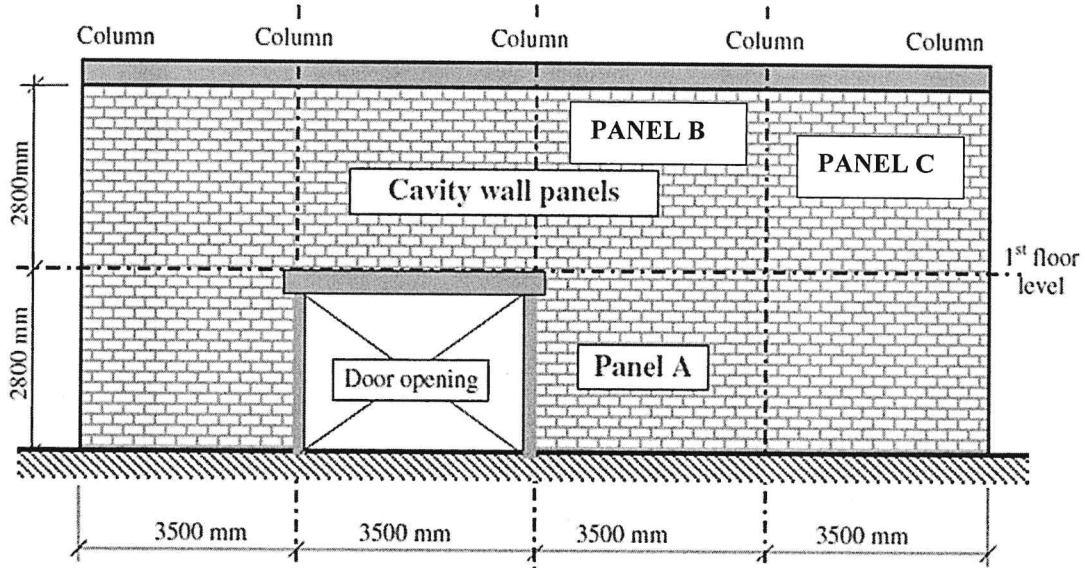


Fig. Q4