(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2015/2016 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DIPLOMA IN CIVIL AND STRUCTURAL ENGINEERING

COURSE CODE: DCE 087

COURSE TITLE: REINFORCED CONCRETE AND MASONRY DESIGN

DATE: TUESDAY 15TH DECEMBER 2015 TIME: 9.00 – 11.00 AM

INSTRUCTIONS:

1. This paper consists of FOUR Questions
2. Answer Question One and any other two questions
3. Examination duration is **2 Hours**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

Question One (compulsory)

a) (i) Explain the forms of structural failure under the following

i. Ultimate state limit (2marks)
ii. Serviceability limit state (2marks)

(ii)You have been appointed the design Engineer for the six storied men`s hostel at the University. Explain what you will be considering in carrying out your duties. (4marks)

b) The figure below is a reinforced concrete beam simply supported carrying uniformly distributed had including self weight of 5kN/m and an imposed weight of 4kN/m. Design the beam for the following to BS 8110

i. Bending reinforcement (8marks)
ii. Shear reinforcement (6marks)
iii. Cracking (1mark)
iv. Deflection (2marks)

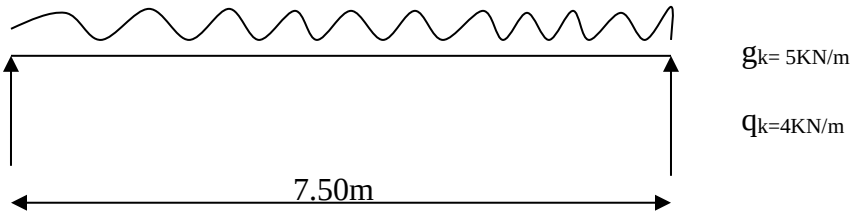
Design data:-

Exposure condition -Mild

Fire Resistance $-1^1/_2$hrs

Concrete cube strength $-25N/mm^2$

Steel characteristics strength $-460N/mm^2$

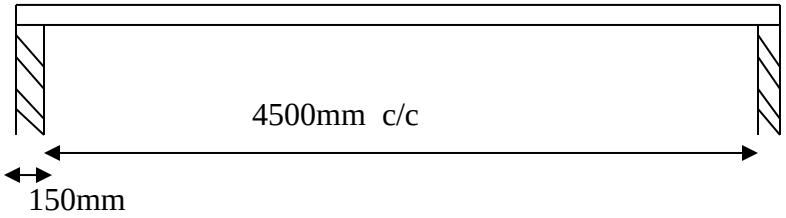


Question Two

The figure below is a reinforced concrete floor stab with an imposed loading of 3KN/m^2 spanning between the brick walls with the following design data:-

f_{cu} =20N/mm2 Exposure condition =Mild

fy=460N/mm2 Fire resistance =$1^1/_2$ hrs



Design the floor for:-

i. Bending moment (10 marks)

ii. Check for deflection and cracking (5 marks)

Question Three

A 400mm square column carries a dead lived G_k=1200KN and imposed load Q_k =300KN.The safe bending capacity of the soils is 170KN/m^2.Design a square footing to carry the loading given the following (to Bs 8110)

Concrete characteristics strength f_{cu} = 20N/mm^2

Fy=460N/mm^2

Footing self weight =125KN (15 marks)

Question Four

A short braced column with f_{cu} =20N/mm^2 and f_y=460N/mm^2 is required to support an ultimate load axial load of 2000KN. Determine a suitable section for the column assuming that the area of longitudinal steel A_{sc} is of the order of 30% of the gross-sectional area of the column H_{col}**.**

(15 marks)