THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN CIVIL ENGINEERING

EBC 2303: REINFORCED CONCRETE AND MASONRY DESIGN

END OF SEMESTER EXAMINATION
SERIES: AUGUST 2012
TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One (20 Marks)

a) Outline the process of structural design. **(5 marks)**

b) The floor of a classroom block 6.5m by 12.0m consists of five reinforced concrete beams equally spaced at 3.0m centres and monolithically together with the slab. The beams are in turn supported on reinforced concrete columns. Design the slab given the following information:

- Imposed load on floor = $2.5KN/m^2$
- 20mm thick screed on uppers side of slab.
- 15mm thick screed on lower side of slab.
- P.V.C floor tiles of weight = $0.15KN/m^2$
- Density of concrete = $24N/mm^3$
- Permissible local bond stress = $1.25KN/m^2$
- Density of screed = $18KN/m^3$
- Pst = $210N/mm^2$
- Pcb = $7N/mm^2$
- Density of concrete = $18KN/m^3$ **(13 marks)**

c) Sketch a section through the shorter span showing the arrangement of reinforced. **(2 marks)**

Question Two (20 marks)

a) Figure 1 shows a plan of an office block. Design panel 'X' of the slab.

b) Sketch a section through the shorter span showing the arrangement of reinforcement. **(20 marks)**

PLAN

A

Data:

- Imposed load on floor = 3.0 KN/m^2
- Density of concrete = 24KN/m^3
- Finishes on floor = 0.6KN/m^2
- Pst = 210N/mm^2

Question Three (20 marks)

The floor of a hall of clear spans 3.0m by 7.0m is supported on 200mm thick block walls on all its FOUR sides.

a) Design the slab
b) Sketch a section through the shorter span to show the arrangement of reinforcement.

(20 marks)

Data

- Pst = 20N/mm^2
- Density of concrete = 24KNm^3
- Finishes on slab = 0.7KN/m^2
- Imposed load on slab = 2.5KN/m^2

Question Four (20 marks)

a) State factors governing structural design.
b) The floor of a classroom block 6.5m by 15.0m consists of five reinforced concrete beams spaced at 3.0m centres and monolithically casted together with the slab. The beams are in turn supported on reinforced concrete columns.

Design typical T-beam

Data

- Imposed load on floor = $2.5KN/m^2$
- Finishes on floor = $0.6KN/m^2$ **(20 marks)**

Question Five (20 marks)

a) Define design loads

b) Design typical L-Beam in question 4(b) **(20 marks)**