TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 12)

EBC 2304: REINFORCED CONCRETE & MASONRY DESIGN

END OF SEMESTER EXAMINATION
SERIES: APRIL 2014
TIME ALLOWED: 2 HOURS

<u>**Instructions to Candidates:**</u>
You should have the following for this examination
- *Answer booklet*
- *Drawing Paper*
- *Drawing Instruments*

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

Question One

A r.c. column 250mm by 250mm of actual length 4.0m is required to support an axial load of 400KN and transits the same to its square column. Design:

a) The column **(9 marks)**
b) The column base **(11 marks)**

Data

- Pst = 210N/mm^2
- Psc = 175N/mm^2
- Pcc = 5.3N/mm^2
- Bearing capacity of soil = 260KN/mm^2
- Permissible local bond stress = 1.25N/mm^2
- Permissible shear stress = 0.7N/mm^2

Question Two

a) Define the following design loads:
   (i) Dead loads
   (ii) Imposed loads
   (iii) Wind loads
   (iv) Thermal loads **(6 marks)**

b) The floor of a hall 4.0m by 6.0m is simply supported on 200mm coral block walls on all its four sides. Design the slab and sketch a section through the shorter span to show the arrangement of reinforcement. **(14 marks)**

   Data:

   - Pst = 210N/mm^2
   - Imposed on floor = 0.7KN/m^2
   - Imposed load = 3.0KN/m^2
   - Density of concrete = 24KN/m^3
   - Permissible local bad stress = 1.25N/mm^2

Question Three

The floor of a classroom block 7.0m by 12.0m is supported on FIVE r.c. beams equally spaced at 3.0m. Centres and monolithically casted together. The beams are in turn supported on r.c. columns.

a) Design the slap **(15 marks)**
b) Sketch a section through the shorter side to show the arrangement of reinforcement. **(5 marks)**

Data:
- 20mm thick screed on the upper side of slab
- 15mm thick screed on the lower side of slab

-   PVC floor tiles of weight   = 0.15kg/m^2
-   Density of screed   = 18KN/m^3
-   Density of concrete   = 24KN/m^3
-   Permissible local bond stress =   1.25N/mm2

Question Four

a) Outline the process of structural design.   **(8 marks)**

b) Design typical T-beam in question three including shear reinforcement. Adopt some data.
   (12 marks)

Question Five

a) State factors governing structural design.   **(6 marks)**

Figure 1 shows a plan of an office block.

Design panel 'X' and 'Y' and sketch a section through the shorter side to show the arrangement of reinforcement.   **(14 marks)**

Data:

-   Imposed load on floor   = 2.5KN/m^2
-   Finishes on floor   = 0.6KN/m^2
-   Density of concrete   = 24KN/m^3
-   Pst   = 210N/mm^2

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