



TECHNICAL UNIVERSITY OF MOMBASA
**Faculty of Engineering &
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING

EBC 2303: REINFORCED CONCRETE & MASONRY DESIGN

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2013

TIME ALLOWED: 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

- a) Masonry has been used as a structural material housing more than $\frac{3}{4}$ of the human population. State THREE main reasons necessary for masonry design **(5 marks)**
- b) State THREE methods of grading structural timber. **(4 marks)**
- c) Timber joists spaced at 2.0m centres spans 3.0m.
- (i) Select a suitable section for bending requirements
- (ii) Check for:
- Shear
 - Deflection
- (11 marks)**

Data

- Permissible stress in bending = 8.5N/mm^2
- E timber = 10kN/mm^2
- Permissible stress in shear = 12N/mm^2
- Permissible deflection = $\text{Span}/300$

Question Two

The floor of classroom block 7.0m by 12.0m consists of FIVE r.c. beams monolithically casted together with the slab. **(16 marks)**

- a) Design the slab
- b) Sketch a section through the shorter side to show the arrangement of reinforcement. **(4 marks)**

Data:

- Centre to centre of beams = 3.0m
- 25mm thick screed on upper side of slab
- 15mm thick screed on lower side of slab
- PVC floor tiles of weight = 0.2kg/m^2
- Density of concrete = 24kN/m^3
- Density of screed = 18kN/m^3
- Permissible local bond stress = 1.25N/mm^2

Question Three

- 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 4.5m by 6.5m is simply supported on 200mm thick coral blocks on its four sides. Design the slab and sketch a section through the shorter side to show the arrangement of reinforcement.

Data:

- P_{st} = 210N/mm²
- Finishes on floor = 0.8kN/m²
- Imposed load on floor = 2.5kN/m²
- Density of concrete = 24kN/m³
- Permissible local bond stress = 1.25N/mm² **(14 marks)**

Question Three

- a) Outline the process of structural design. **(8 marks)**
- b) Design typical T-beam in question 2 assuming the same information and check for shear. **(12 marks)**

Question Four

- a) Highlight the THREE ways in which a contractor may be selected in a selective type of tendering method. **(3 marks)**
- b) Define: **(3 marks)**
- (i) A contract
 - (ii) Responsibility
 - (iii) Authority
- c) Briefly describe the FOUR common relationships which exist in any organization structure or span of control giving examples for each. **(8 marks)**
- d) List SIX essentials of a valid contract **(6 marks)**

Question Five

- a) Name SEVEN professional bodies which commonly registers professional parties in the construction industry. **(7 marks)**
- b) Using a well labeled sketch, show an organization structure for a medium sized construction firm. **(5 marks)**
- c) Outline EIGHT factors to consider when choosing a supplier for construction materials. **(8 marks)**