



# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

*Faculty of Engineering and Technology*

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

**HIGHER DIPLOMA IN BUILDING & CIVIL ENGINEERING**

EBC 3133: CONSTRUCTION TECHNOLOGY & SERVICES I

**END OF SEMESTER EXAMINATION**

SERIES: AUGUST/SEPTEMBER 2011

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer booklet*
- *Calculator*
- *Drawing instruments*

This paper consists of **FIVE** questions in **TWO** sections **A & B**

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **FOUR** printed pages

## SECTION A (COMPULSORY)

### Question 1

a) When planning a site layout plan, the contractor must consider, amongst others, the following preliminary items:

- (i) Access to the site
- (ii) Access on the site
- (iii) Site offices
- (iv) Adjoining properties
- (v) Security of the site
- (vi) Storage of materials
- (vii) Safety on site

State any **TWO** factors to be considered in any **THREE** of the above items (6 marks)

b) Briefly explain the following concepts of construction stating the suitability of each:

- (i) Framed construction
- (ii) Load bearing wall construction (6 marks)

c) Briefly explain the following functional requirements of a building structure.

- (i) Strength
- (ii) Stability (6 marks)

d) With the aid of a sketch, outline the procedure for setting out column positions in a framed structure using a theodolite (6 marks)

e) (i) Briefly state the **THREE** Building Code requirements for foundations of building structures

- (ii) With the aid of sketches, differentiate between End Bearing Piles and Friction Piles (6 marks)

## SECTION B (Answer any *TWO* questions from this section)

### Question 2

a) (i) With the aid of a sketch illustrate the Sump Pumping method of dewatering

(ii) Briefly explain the uses of any **THREE** of the following construction materials

- Aggregates
- Cement
- Steel
- Plastics

(7½ marks)

- b) (i) With the aid of sketches, describe the ‘Test Loading’ method of determining the ultimate bearing capacity of a pile foundation
- (ii) With the aid of sketches, illustrate the following types of foundations:
- Beam and slab foundation
  - Cellular raft foundation
- (9 marks)
- c) With the aid of sketches, describe the “Battered Sides” method of basement excavation  
(3 ½ marks)

### Question 3

- a) (i) Briefly outline the procedure for approval of building plans by local authorities in Kenya
- (iii) The following are inspection notices that a contractor forwarded to a local authority:
- The foundation bed
  - The foundation concrete
  - The damp-proof course
  - The reinforcement placed

Briefly explain the aspects that would be checked in any **THREE** of the above cases (9 marks)

- b) (i) Describe any **THREE** items involved in site clearance
- (ii) Explain the term ‘integral tanking’ as applied to basement construction. (4½ marks)
- c) Outline the concept of using bentonite slurry in the construction of a diaphragm wall in a deep basement (6½ marks)

### Question 4

- a) (i) With the aid of a sketch, illustrate timbering to sides of wide excavations in firm soils, not exceeding 3.0m deep.
- (ii) State **THREE** factors to be considered when designing a retaining wall (8 marks)
- b) (i) State any **THREE** reasons that would necessitate drainage of a site.
- (ii) Briefly describe the process of land drainage (7 marks)
- c) State **FIVE** common causes of foundation failure (5 marks)

### Question 5

- a) (i) State any **FOUR** items of information required before dewatering
- (ii) With the aid of sketches describe **THREE** methods of leveling a sloping site (11½ marks)

- b) (i) With the aid of sketches, illustrate the difference between a contraction joint and a construction joint suitable to a basement wall.
- (ii) Differentiate between the terms internal tanking and external tanking as applied to water proofing of basements. (8½ marks)