



# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

*Faculty of Engineering and Technology*

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

**DIPLOMA IN CIVIL ENGINEERING  
DIPLOMA IN ARCHITECTURE**

EBC 4207: CONSTRUCTION TECHNOLOGY

**SPECIAL/SUPPLEMENTARY EXAMINATION**

SERIES: OCTOBER 2011

**TIME: 2 HOURS**

## **Instructions to Candidates:**

You should have the following for this examination

- *Answer booklet*

This paper consists of **FIVE** questions

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

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

## SECTION A (COMPULSORY)

### Question 1

- a) With the aid of suitable sketches, outline the nature and the construction of a beam and slab raft foundation with downstand beams (15 marks)
- b) (i) State the selection criterion which determine the choice of foundations
- (ii) Refer to columns shown in drawing no. CT 03/10. Approximate the total loads (from dead loads, wind loads and imposed loads from the building, per column and from this determine the appropriate width of the pad foundations give that the firm bearing capacity of the soil (red clay soil) at 1.8m deep from the ground level is  $90\text{N/mm}^2$ .
- (iii) From the calculations in (b) above draw the pad foundation and show typical reinforcement for the base (15 marks)

## SECTION B (Answer any TWO questions)

### Question 2

- a) Describe the main features of cantilever counter fort retaining walls, designed to enhance their stability and improve their frictional resistance
- b) Draw a typical counter fort wall and clearly show typical reinforcement for the walls (20 marks)

### Question 3

Describe the following sea front structures, with emphasis to the construction, location and analyze the conditions which the structures are subjected to:

- i) Docks
  - ii) Wharfs
  - iii) Pier fender system
  - iv) Bollards
- (20 marks)

### Question 4

- a) With the aid of suitable diagrams, explain the principles involved in stormwater drainage, stating the materials most commonly used. (6 marks)
- b) For the building project shown in drawing no. CT/03/10 a herring bonesystem combined with a moat system is suggested to maintain the site which is a waterlogged, dry. Illustrate this system (14 marks)

### **Question 5**

A decade after the completion of the office project (CT/03/10) the building started showing major signs of cracks localized at the north eastern corner of the main building

- a) Outline suitable underpinning for the wall foundations around this area
- b) Detail appropriate underpinning for the column marked C1, with the aid of appropriate sketches. (20 marks)