



**THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE**

**(A Constituent College of JKUAT)**

(A Centre of Excellence)

# **Faculty of Engineering & Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

**HIGHER DIPLOMA IN BUILDING & CIVIL ENGINEERING (HDBCE 11)**

EBC 3218: MEASUREMENTS, ESTIMATING & COSTING

**END OF SEMESTER EXAMINATION**

**SERIES: DECEMBER 2012**

**TIME: 3 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*
- *Pocket Calculator*
- *Dimension Paper*
- *A Copy of the Standard Method of Measurement for Building Works*

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

### **Question One (Compulsory)**

- a) Take off all quantities for the door shown in drawing No. 01 including adjustments. **(20 marks)**
- b) Outline the following contract documents.
- (i) Contract drawings
  - (ii) Bills of quantities
  - (iii) Specifications
  - (iv) Tender form
- (10 marks)**

### **Question Two**

Describe the following approximate estimating methods giving **TWO** merits and **TWO** demerits of each method.

- (i) Functional unit method
  - (ii) Cubic method
  - (iii) Superficial area method
  - (iv) Approximate quantities method
- (15 marks)**

### **Question Three**

- a) State **SIX** factors that affect the operating cost of a mechanical plant. **(3 marks)**
- b) Describe the sum of number of years method of depreciation of a mechanical plant. **(3 marks)**
- c) Use the data in Appendix "A" to build up the unit rate of Excavation per m<sup>3</sup> using the plant. **(9 marks)**

### **Question Four**

- a) Outline **SIX** sources of cost information. **(9 marks)**
- b) Describe the following terms used in building economics.
- (i) Cost plan
  - (ii) Cost check
  - (iii) Market
  - (iv) Cost analysis
- (6 marks)**
- Build up a unit rate for the following using the data given in appendix 'A'.

### **Question Five**

- a) Define the term "unit rate" **(2 marks)**
- b) Build up the rates for the following works using the data given in Appendix "A"
- (i) Reinforced concrete mix 1:2:4 20mm agg in 150mm thick ground floor slab (per m<sup>2</sup>)
  - (ii) 16mm  $\phi$  high tensile steel bars including tying wires and cover blocks **(13 marks)**

## Appendix 'A'

### General Information

- Labour
- Skilled @ ksh. 80/hr
  - Unskilled @ ksh. 50/hr
- Materials
- Cement 50kg Bag @ 700ksh.
  - Sand 1 Tonne @ 1500 ksh.
  - Aggregates density = 1400kg/m<sup>3</sup>
  - Sand density = 1500kg/m<sup>3</sup>
  - Aggregates density = 1500kg/m<sup>3</sup>
  - Reinforcement bars 12mm  $\phi$  @ ksh. 60/kg
  - Tying wires 2 ksh. 150/kg
  - Nails 2 ksh 150/kg
  - Formworks timber @ ksh. 30,000/m<sup>3</sup>

### Plant

- Cost of Backactor = ksh. 5,000,000/-
  - Resale value after 5 years = 500,000 /-
  - Interest on Capital = 10% per annum
  - Maintenance, Repairs, Insurance, Taxes = 70% of annual depreciation
  - Fuel consumption 5 litres/hour @ ksh 100/litre
  - Number of hours worked in a year = 2000
  - Bucket capacity = 0.5m<sup>3</sup>
  - Cycle time = 5 minutes
  - Efficiency of machine = 90%
- Use straight line method of depreciation