



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

DEPARTMENT OF BUILDING & CIVIL ENGINEERING  
**HIGHER DIPLOMA IN BUILDING & CIVIL ENGINEERING (HDBCE)**

EBC 3208: ESTIMATING & COSTING OF BUILDING & CIVIL WORK

**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 **FOUR** 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) Outline FIVE sources of cost information to an estimator **(10 marks)**
- b) Explain the following methods of approximate estimating:  
(i) Functional unit method  
(ii) Superficial area method **(6 marks)**
- (c) Define the following terms:  
(i) All in labour rate  
(ii) All in plant rate **(4 marks)**

### Question Two

- a) Describe how the following design variables affect the cost of a building:  
(i) Overall height-storey height  
(ii) Size of the building  
(iii) Circulation area  
(iv) Plan shape **(8 marks)**
- b) Describe the following terms used in estimating:  
(i) Market  
(ii) Cost check  
(iii) Cost analysis  
(iv) Cost plan  
(v) Unit rate  
(vi) All in labour rate **(12 marks)**

### Question Three

- a) Using hypothetical examples describe the following methods of mechanical plant depreciation:  
(i) Straight line method  
(ii) Sum of number of years method **(6 marks)**

- b) Using the data given below buildup a unit rate for 1m<sup>3</sup> of concrete (per m<sup>3</sup>)

Data

Cement density = 1440kg/m<sup>3</sup>

Sand density = 1500kg/m<sup>3</sup>

Aggregates density = 1500kg/m<sup>3</sup>

Cement @ 600ksh/50kg bag

Sand @ 1000ksh/Tonne

Aggregate @ 2000 kshs/Tonne

Shrinkage and waste allowance = 35%

Machine purchased at 500,000ksh

Scrap value @ 100,000 ksh

Useful life of machine = 2 years

Machine works at 2000 hour per year

- Machine capacity = 250 litres
- Insurance = 10% of purchase price per annum
- Taxes, maintenance, repairs, insurance @ ksh 100,000 per annum
- Machine consumes 10 litres of diesel per day @ ksh 100/litre
- Lubricant at kshs 100 per day
- Machine is 100% efficient
- Cycle time of machine = 6 minutes
- Assume any other necessary information
  - skilled labour @ 100ksh.hr
  - unskilled labour @ 50ksh/hr

**(14 marks)**

#### **Question Four**

With the use of the data given build up a unit rate for excavating basement commencing from ground level and not exceeding 1.50m deep (per m<sup>3</sup>) **(20 marks)**

Data

- Basement size 75 x 40 x 150m deep
- Purchase price of 0.50m<sup>3</sup> capacity excavator shs 8,000,000/=
- Excavator cycle time
- Excavator efficiency 80%
- Economic plant life 5 years
- Working hours per annum 1800 hours
- Interest on capital 10% per annum
- Insurance, taxes, maintenance, repairs 30% of annual depreciation
- Diesel consumption per 8 hour day 100 litres
- Diesel cost 100 shs/litre
- Lubricating oil per week 10 litres @400ksh/litre
- Haulage to and from site kshs 300,000 per annum
- Skilled labour per hour 150ksh
- Unskilled labour per hour 80 ksh
- Assume any other necessary information