



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

((A Constituent College of JKUAT)

(A Centre of Excellence)

**Faculty of Engineering
& Technology in Conjunction with
Kenya Institute of Highways and
Building & Technology (KIHBT)**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

HIGHER DIPLOMA IN CONSTRUCTION

EBE 3304: ESTIMATING & COSTING II

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Pocket Calculator*

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

Answer question **ONE** 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 – 30 MARKS)

Question One (30 Marks)

- a) Build up a unit rate for vibrated reinforced concrete (1:2:4) in 150mm thick bed (per m²) **(20 marks)**
- b) Build up a detailed hourly labour rate for a skilled tradesman using the data below:
- Working period – 40 hours per week
 - Overtime – 2 hours on Saturday (per week)
 - Annual leave – 30 days per year
 - Sick leave – 14 days per year
 - Medical benefits – shs 10,000 per year
 - Redundancy payment – 30% of hourly rate
 - N.S.S.F contributions – 5% of direct earning
 - Trade supervision – shs 10.00 per hour
 - Worker shall be accommodated on site. **(10 marks)**

SECTION B (Attempt any TWO questions from this section)

Question Two (20 marks)

Build up a unit rate for excavating and tipping materials for basement commencing from stripped level and not exceeding 1.5m deep (per m³) **(20 marks)**

Question Three (20 marks)

Build up a unit rate for 125mm x 250mm precast concrete (1:2:4) splayed road kerb finished smooth and jointed in cement sand mortar (1:3) and set on and including concrete (1:3:6) bed size 325 x 100 mm thick and all formwork (per m) **(20 marks)**

Question Four (20 marks)

Build up a unit rate for 'half brick wall in 215 x 102.5 x 65mm common bricks bedded and jointed in cement sand mortar (1:3) per m². **(20 marks)**

Question Five (20 marks)

- a) Briefly explain the following methods of approximate estimating giving **TWO** merits and **TWO** demerits of each method:
- i) Functional unit valuation method
 - ii) Cubic capacity method. **(10 marks)**
- b) A proposed storey building has two basement floors size 20 x 20 x 4m and three upper floors size 15 x 15 x 3m. Calculate the approximate cost of this building using the storey enclosure method given that the unit cost is kshs. 10,000/= **(10 marks)**

APPENDIX A

General Information

Skilled labour – shs 800.00 per 8 hour day
Unskilled labour – shs 400.00 per 8 hour day
Cost of materials includes delivery to site
Assume any other necessary information not provided.

Vibrated Reinforced Concrete

Density of sand – 1600kg/m³
Density of cement – 1442kg/m³
Density of ballast – 1500kg/m³
Cement per 50kg bag – shs 700.00
Sand per tonne – shs. 3000.00
Ballast per tonne – shs 3500.00
Price of 200 litre mixer – shs. 400,000.00
Economic working life of mixer – 5 years
Working hours per year – 1800 hours
Maintenance and repairs per year – 30% of the annual maintenance and repair per year – 30% of the annual depreciation
Efficiency of mixer – 85%
Salvage value of mixer – shs 50,000.00
Average interest per year – 25% of purchase price of the mixer
Insurance per year – shs 30,000.00
Diesel consumption per day – 16 litres @ shs 100.00 per litre
Mixer operator – kshs 100.00 per hour
Mixer attendants – 3 attendants @ shs 50.00 per hour each
Hire rate of poker vibrator – shs 6000.00 per day including running costs
Working hours in a day – 8 hours.

Basement Excavation

Purchase price of excavator – shs 30,000.00
Resale value at the end of 5 years shs. 800,000.00
Method of depreciation – straight line
Average interest on capital – 10% of purchase price
Repairs and renewals – 12% of purchase price
Operator pay per hour – shs 50.00
Fuel consumption per hour – 40 litres @ kshs 100.00 per litre
Lubricating oil consumption per hour – 2 litres @ shs 200.00 per litre
Insurance per year – 10% of purchase price
Hours worked per year – 2000 hours
Excavator capacity – 0.5m³
Output of excavator per hour – 11m³
Bulking of excavated material – 30%
Time efficiency per hour – 80%
Tipper capacity – 3.5m³
Average speed of tipper = 30km per hour

Hire rate of tipper – kshs 3000.00 per hour
Round trip to tip – 3 km
Assume any other necessary information

Road kerbs

Cement per 50kg bag – shs 700.00
Sand per tonne – shs 300.00
Ballast per tonne – shs 3500.00
Density of cement – 1442kg/m³
Density of sand – 1600kg/m³
Density of ballast – 1500kg/m³
Precast concrete kerb size 125 x 250 x 900mm – shs 900.00
Thickness of mortar joints – 10mm

Assume any other necessary information
Skilled labour – shs 800.00 per day
Unskilled labour – shs 400 per day

Brick wall

Cost of cement per 50kg bag – shs 700.00
Cost of sand per tonne – shs 3000.00
Cost of 215 x 102 x 65mm bricks – shs 20.00 each
Skilled labour – shs 800.00 per day
Unskilled labour shs. 400.00 per day