# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

**(A Constituent College of JKUAT)**

***Faculty of Engineering and Technology***

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

**DIPLOMA IN BUILDING & CIVIL ENGINEERING**

**DIPLOMA IN CIVIL ENGINEERING & CAD**

EBC 2322: ESTIMATING & COSTING

**END OF SEMESTER EXAMINATION**

SERIES: DECEMBER 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)** from **SECTION A** and any other **TWO** questions from **SECTION B**

Maximum marks for each part of a question are clearly shown

This paper consists of **THREE** printed pages

**SECTION A (COMPULSORY)**

**Question 1 (20 marks)**

a) (i) State **FIVE** factors that affect the operating costs of mechanical plant (2 ½ marks)

(ii) Using hypothetical example price the following item. Allow for disposal of general surface water (item) (7 ½ marks)

b) 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)

c) 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. 6000.00 per $m^2$.

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

**Question 2 (20 marks)**

Using the data given, build up a unit rate for vibrated reinforced concrete (1:2:4) in ground beams (per $m^3$)

**Data**

Cost of cement – kshs. 700/- per 50kg bag
Cost of sand - kshs 2000/- per tonne
Cost of ballast - kshs 3000/- per tonne
Density of cement -1440kg/$m^3$
Density of sand - 1600kg/$m^3$
Density of ballast -1700kg/$m^3$
Purchase price of 300 litre mixer – kshs 250,000/=
Interest on capital – 15%
Hours worked in a year - 1600 hours
Maintenance and repairs -70% of the annual depreciation
Fuel consumption – 3 litres per hour at kshs 110/= per litres
Skilled labour – kshs 100/= per hour
Unskilled labour – kshs 5-/= per hour
Mixing time – 4 minutes per cycle
Efficiency - 56 minutes per hour
Assume any other necessary information not given

**Question 3 (20 marks)**

a) Briefly describe the following terms
   (i) Labour constants
   (ii) Pro-rata rates
   (iii) Preliminary items (4 ½ marks)

b) Using the data given build up a unit rate for 265 x 165 x 15mm clay tiles laid on 50 x 25mm sown softwood battens and nailed at every fourth couse with 32mm long mild steel nails (per $m^2$) (15 ½ marks)

**Data**

| | | |
|---|---|---|
| Cost of tiles | - | kshs 70/- per piece |
| Cost of 50 x 25mm sown softwood | - | ksh 40/= per m |
| Cost of 32mm long mild steel nails | - | kshs 80/= per kg |
| Unskilled labour | – | kshs 50/= per hour |

Assume any other necessary information

**Question 4 (20 marks)**

Using the data given build up a unit rate for making and fixing in position a softwood framed, ledged, braced and battened door size 800 x 2100 x 50mm consisting of 100 x 50mm stiles and top rail, 225 x 32mm middle and bottom rail, 100 x 32mm braces, 75 x 18mm T and G battens (per $m^2$) (20 marks)

**Data**

| | | |
|---|---|---|
| Cost of sown softwood | - | kshs 8000/- per $m^3$ |
| Cost of wood glue | - | kshs 200/= per kg |
| Cost of sand paper | - | ksh 10/- per piece |
| Cost of wedges | - | kshs 2/= each |
| Cost of plaining | - | kshs 10/= per m for all sizes |

Costs of materials are inclusive of transport costs

| | | |
|---|---|---|
| Skilled labour | - | shs 100/= per hour |
| Unskilled labour | - | shs 50/- per hour |

Assume any other necessary information

**Question 5 (20 marks)**

Using the data given, build up a unit rate for the following item, cart away deposit spread and level'(per $m^3$) (20 marks)

**Data**

| | | |
|---|---|---|
| Purchase price for 12 tonne tipper | - | kshs 10,000,000/- |
| Resole value after 5 years | - | kshs 2,000,000/- |
| Interest on capital | - | 10% per annum (year) |
| Maintenance, repairs and insurance | – | 70% of the annual depreciation |
| Fuel consumption | – | 10 litres per hour at kshs 110/- per litre |
| Hours worked in a year | - | 1500 hours |
| Hire rate for grader | - | kshs 200,000/= including the operator |

Tyres changed twice per year for the tipper

| | | |
|---|---|---|
| Cost of one tyre of tipper | - | shs 60,000/- each |
| Volume deposited | - | 50,000$m^3$ |
| Capacity of tipper | - | 15m3 per trip |
| Tipping fee | - | shs 5/- per $m^3$ |
| Distance to tip | - | 10 km |
| Speed when tipper is fully loaded | - | 20 km/hour |
| Speed when tipper is empty | - | 40km/hour |
| Skilled labour | - | kshs 100/- per hour |
| Unskilled labour | - | kshs 50/= per hour |

Assume any other necessary information not given