



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

HIGHER DIPLOMA (BRIDGING) BUILDING CONSTRUCTION

ESTIMATING AND COSTING

FINAL EXAMINATION

SERIES: APRIL/MAY 2010

TIME: 3 HOURS

Instructions to Candidates:

You should have the following for this examination:

- Answer Booklet
- Pocket Calculator

This paper consists of **FIVE** questions.

Answer any **FOUR** questions.

All questions carry equal marks.

Maximum marks for part of question are as shown.

- Q.1 (a) Indicate and briefly explain **FIVE** factors which may affect the prices to be quoted for concrete works. (15 marks)
- (b) Build up a unit rates for the following items:-
Excavate Pit for column base not exceeding 1.50m deep. [CM] (10 marks)
- Q.2 (a) Build up the hourly rate of owning and operating a 200 liter capacity concrete mixer using the following information:- (20 marks)
- Purchase of new mixer Kshs.1,600,000.00
 - Salvage value after six (6) years Kshs.185,000.00
 - Cost of transport per year Kshs.40,000.00
 - Interest and Insurance per year 30% of annual depreciation
 - Maintenance and repairs per year 20% of annual depreciation
 - Annual working time 2000 hours
 - Fuel per 8 hour working day Kshs.2,400.00 [CM]
 - Skilled duties carried out at 50% of total time
- (b) If the concrete mixer in question 2(a) above has a time cycle of 5 minutes, calculate its output. (5 marks)
- Q.3 Build up unit rates for the following items:-
- (a) Excavate to reduce levels. [CM] (10 marks)
- (b) 100mm thick BRC Reinforced Concrete 1:2:4, 20mm aggregate over site floor slab. [SM] (15 marks)
- Q.4 (a) State **FOUR** types of plant used for excavation works and the type of works that each may be deployed. (15 marks)
- (c) Build up an ALL-in Rate for a Supervisor given the following data.
- | | | |
|-----------------------------------|--------------|------------|
| Monthly Salary | sh.18,000.00 | |
| House Allowance per month | sh.3,600.00 | |
| Hourly all in rate for an Artisan | sh.90.00 | |
| Number supervised | six (6) | (10 marks) |
- Q.5 (a) Give **FOUR** reasons why the percentage of on-costs varies from tenderer to tenderer. (10 marks)
- (b) Explain with brief description how the following design variables affect the cost of buildings. (15 marks)
- Size of the Building
 - Services
 - Circulation area

DATA FOR USE IN ESTIMATING AND COSTING

All-in Skilled labour rate per hour	sh.90.00
All-in unskilled labour rate per hour	sh.80.00

Labour constants:

Excavate top soil average 150mm deep per SM	0.35 hrs
Excavate to reduce levels average 150mm deep per SM	0.45 hrs
Excavate to reduce levels average 200mm deep per CM	2.40 hrs
Excavate foundation trench not exceeding 1.50m deep per CM	3.25 hrs
Excavate foundation trench exceeding 1.50m but not exceeding 3.00m deep per CM.	6.50 hrs
Excavate pit for isolated base not exceeding 1.50m deep per CM	5.00 hrs
Excavate pit for isolated base exceeding 1.50m but not exceeding 3.00m deep per CM	10.00 hrs
Offloading cement in 50 Kg. bags per ton	1.50 hrs
Mixing, transporting, placing and compacting concrete in foundation trenches not exceeding 150mm thick per CM	4.66 hrs
Mixing, transporting, placing and compacting concrete in foundation trenches 150-300mm thick per CM	4.33 hrs

Materials:

Cement in 50 Kg. bags delivered to site	sh.700.00
Fine aggregate (sand) per ton delivered to site	sh.800.00
Ballast per ton delivered to site	sh.1,800.00
Density of Cement	1442 Kg.
Density of Sand	1600 Kg.
Density of Ballast	1550 Kg.
Waste on concrete materials	10%
Shrinkage and voids in concrete	40%
Overheads and Profit	20%
Mixing, transporting, placing and compacting concrete in beds 100-150mm thick per SM	0.90 hrs
Adjustment for unreinforced concrete deduct per CM	0.66 hrs