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**CONSTRUCTION MANAGEMENT II,
ESTIMATING AND COSTING II**

June/July 2022

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN BUILDING TECHNOLOGY
DIPLOMA IN CIVIL ENGINEERING
DIPLOMA IN ARCHITECTURE**

MODULE III

CONSTRUCTION MANAGEMENT II, ESTIMATING AND COSTING II

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Mathematical tables/Scientific calculator.

This paper consists of EIGHT questions in TWO sections, A and B.

Answer FIVE questions choosing THREE questions from section A and TWO questions from section B.

All questions carry equal marks.

Maximum marks for each part of a question are indicated.

Candidates should answer the questions in English.

This paper consists of 7 printed pages.

**Candidates should check the question paper to ascertain that
all the pages are printed as indicated and that no questions are missing.**

SECTION A: CONSTRUCTION MANAGEMENT II

Answer **THREE** questions from this section.

1. (a) Describe five steps of project management. (10 marks)
- (b) (i) Distinguish between project and project management; (4 marks)
- (ii) Explain each of the following approaches to project implementation:
- (I) top-bottom; (2 marks)
- (II) bottom-up; (2 marks)
- (III) collaborative participation. (2 marks)
2. (a) Highlight five uses of critical path analysis (CPA) as a tool in project evaluation. (5 marks)
- (b) Table 1 shows the activities of a construction project and their durations. Prepare:
- (i) an arrow network diagram and determine the project duration.
- (ii) an analysis sheet to determine critical activities and total floats. (15 marks)

Table 1

Activity	Duration (weeks)
1 – 2	12
2 – 3	14
2 – 4	10
3 – 5	8
4 – 5	6
5 – 6	4

3. (a) Outline four aims of workstudy. (4 marks)

- (b) Table 2 shows a record of time study of cycles for a construction operation.

Table 2

Element No.	Observed rating (OR)	Observed time (OT) min	Total relaxation allowance
Check time		0.00	
Cycle I			
1	95	1.35	25
2	105	2.65	26
3	100	4.45	32
4	90	6.75	27
Cycle II			
1	90	12.65	25
2	100	13.85	26
3	105	15.48	32
4	95	17.95	27
Cycle III			
1	100	26.45	25
2	95	27.95	26
3	100	32.95	32
4	105	34.60	27

Contingency allowance is given as 2%. Calculate the standard time for the operation. (16 marks)

4. (a) Define motivation as a function of management. (2 marks)
- (b) Highlight six factors to consider in determining the number of people in a span of control. (6 marks)
- (c) State four benefits of delegation to each of the following in an organisation.
- (i) supervisor;
- (ii) subordinates.

(12 marks)

5. From the following trial balance of Lolwe Construction Co. Ltd, draw a trading, profit and loss account and a balance sheet as at 30th September 1999. (20 marks)

	Dr	Cr
Stock 1st October 1998	2,368	
Carriage outwards	200	
Carriage inwards	310	
Returns inwards	205	
Returns outwards		322
Purchases	11,874	
Sales		18,000
Salaries and wages	3,862	
Rent and rates	304	
Insurance	78	
Motor expenses	664	
Office expenses	216	
Lighting expenses	166	
General expenses	314	
Premises	5,000	
Motor vehicles	1,800	
Fixtures and fittings	350	
Debtors	3,896	
Creditors		1,731
Cash at bank	482	
Drawings	1,200	
Capital		12,636
	33,289	33,289

SECTION B: ESTIMATING AND COSTING II

Answer TWO questions from this section.

6. (a) Using the data given in table 3 build up unit rate for the following:

Supply and fix 1200 × 1100 mm steel casement window with two opening sashes and one fixed light (per No.) (8 marks)

Table 3:

Cost of steel casement windows size 1200 × 1100 mm = Ksh 3,500

Labour constants for unloading and fixing metal windows per each

Size of window (m ²)	Unloading (hrs)	Fixing joiner (hrs)
Upto 0.5 m ²	$\frac{1}{20}$	1
0.5m ² to 1.0 m ²	$\frac{1}{16}$	$1\frac{1}{2}$
1 m ² to 2.0 m ²	$\frac{1}{12}$	2
2.0 m ² to 3.0 m ²	$\frac{1}{8}$	$2\frac{1}{2}$

Profits, overheads and taxes - 36%

Make reasonable assumptions not given.

- (b) Using the data given in table 4, build up unit rate for: Excavate trench for 100 mm drain pipe not exceeding 1.50 m deep, average depth 1.00 m deep (per L.m).

(12 marks)

Table 4

Widths of trenches for pipes upto 300 mm diameter

Depth (m)	Width (mm)
Upto 1.50 m	700 mm
1.50 m to 3.0 m	800 mm
3.0 m to 4.5 m	1000 mm

NB: Hand excavation = $1\frac{1}{2}$ hrs/m³

Average $\frac{7}{8}$ of total volume excavated is returned to trench and takes 1 hr per m³, while $\frac{1}{8}$ being removed from site and takes 1 hr per m³.

Labour: Unskilled = Ksh 50
 Skilled = Ksh 100

Make reasonable assumptions not given.

7. Build up unit rate for the following using data given.

(a) 50 mm p.c.c. slabs size 600 × 600 mm bedded and jointed in cement/sand mortar (1:3)
(per m²). (12 marks)

(b) 125 × 250 p.c.c. kerbs bedded and jointed in cement/sand mortar (1:4)
(per L.M.). (8 marks)

Data:

- Cost of p.c.c. slabs size 600 × 600 mm = Ksh 450 per piece

- Unloading $\frac{1}{8}$ hrs per m²

- Waste 5%

- Cost of 125 × 250 p.c.c. kerbs = Ksh 550 per piece

- Unloading $\frac{1}{12}$ hrs per L.M.

- Waste = $2\frac{1}{2}$ %

Labour in laying slabs = $\frac{1}{3}$ hrs skilled and $\frac{1}{6}$ hrs unskilled per m²

Labour in laying kerbs = $\frac{1}{5}$ hrs skilled and $\frac{1}{10}$ hrs unskilled per L.M.

Mortar for bedding slabs per m² = $\frac{1}{40}$ m³

Mortar for laying and joining kerbs per L.M. = $\frac{1}{200}$ m³

Cost of cement = Ksh 23,000 per m³

Cost of sand = Ksh 1250 per m³

Waster and shrinkage on mortar = 35%

Skilled labour = Ksh 100 per hour

Unskilled labour = Ksh 50 per hour

Profits, overheads and taxes = 36%

Make reasonable assumptions not given.

8. Using the data given, build up unit rate for the following:

- (a) 265 × 165 p.c.c. plain concrete roofing tiles laid to 65 mm laps, fixed at 30° pitch each tile double nailed with galvanized nails to and including 38 × 25 mm softwood timber battens (per S.M). (12 marks)
- (b) B.R.C mesh A 142 weighing 2.22 kg/m² in ground slab including binding wires, spacer block and laps (per S.M). (8 marks)

Data

Roofing tiles size 265 × 165 mm	-----	Ksh 70 per each
Galvanized nails	-----	Ksh 200 per kg
38 × 25 mm battens	-----	Ksh 55 per L.M.
Ordinary nails	-----	Ksh 130 per kg
2.1 × 45 m B.R.C mesh A 142 roll	-----	Ksh 12,500
✓ Binding wire per kg	-----	Ksh 120
✓ Spacer blocks	-----	Ksh 12 per each
✓ Labour: gangs (1:1)	-----	
Skilled	-----	Ksh 100 per hour
Unskilled	-----	Ksh 50 per hour
No. of tiles laid per hour	-----	100 pieces
Metres of battens fixed per hour	-----	50 metres
✓ Labour in laying mesh	-----	$\frac{1}{20}$ hrs per m ²
Unloading tiles	-----	1000 tiles per hr
Waste on tiles	-----	5%
Waste on nails and battens	-----	10%

Make reasonable assumptions not given.

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