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

June/July 2019

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;

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.

Maximum marks for each part of a question are as indicated.

Candidates should answer the questions in English.

This paper consists of 6 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.

- ✓ (a) Define the following terms as used in work measurement:
- (i) break point;
 - (ii) effective time;
 - (iii) check time;
 - (iv) idle time. (4 marks)
- (b) Explain **three** ways of reducing material wastage in construction. (6 marks)
proper storage, via, avoid wastage
- (c) Explain **five** sources of the Kenyan law. (10 marks)
Indian constitution, Kenya constitution
- 2/ (a) State **two** advantages and **two** disadvantages of each of the following payment systems:
- (i) day work; *Adv. Adv.*
 - (ii) piece work. (8 marks)
- (b) Outline **four** functions of trade unions. (6 marks)
- (c) Explain **three** books of accounts. *7/10/10, 7/10* (6 marks)
3. **Table 1** shows a construction activity data.
- (a) Draw an arrow network diagram and show the critical path.
 - (b) Using analysis table, determine the earliest and latest start and finish time for the activities.
 - (c) Calculate the total floats and free floats. (20 marks)



Table 1

ACTIVITY	PREDECESSOR	t_m	t_o	t_p
A	—	3	2	4
B	A	6	5	7
C	A	4	3	5
D	A	10	8	12
E	C	8	7	9
F	B	6	5	7
G	D	6	8	7
H	B	7	6	8
I	E,F	5	4	6
J	H	11	7	9
K	I,G	4	3	5
L	D	2	4	6
M	L	6	4	8
N	L	4	2	6
O	J,K	8	6	19
P	J,K	6	7	11
Q	N,O	4	6	8

4. (a) Explain three objectives of a tort. (6 marks)
- (b) Define the following terms as used in law:
- (i) libel;
 - (ii) mortgage;
 - (iii) arbitration;
 - (iv) defamation. (8 marks)
- (c) Explain the three remedies for conversion as used in law of tort. (6 marks)



SECTION B : ESTIMATING AND COSTING II

Answer **TWO** questions from this section.

6. (a) State six factors that affect the operation cost of a mechanical plant. (6 marks)
- (b) Build up a unit rate for B.R.C mesh A 98 including laps, bends, tying wires and spacer blocks using the following data.

Data

BRC mesh A 98	Kshs 18,00 per 50 m x 2 m roll
Tying wires	Kshs 90 per kg
Spacer blocks	Kshs 3 each
Skilled labour	Kshs 100 per hour
Unskilled labour	Kshs 50 per hour

Assume any other relevant information.

(14 marks)

7. (a) Build up a unit rate for the following item; 265 x 165 x 15 mm plain clay tile on 50 x 25 mm sawn cypress batten with 65 mm end laps nailed at every fourth course with 32 mm long galvanised mild steel nails using the following data;

Data

Cost of timber	Kshs 1000 per m ³
Cost of nails	Kshs 120 per kg
Cost of one plain clay tile	Kshs 20
Skilled labour	Kshs 100
Unskilled labour	Kshs 50



Assume any other relevant information.

(14 marks)

- (b) Build up a unit rate for three coats of plastic emulsion paint on an internal plastered surface using the following data.

Data

Cost of primer	Kshs 1000 per 4L tin covering 10 m ² per litre
Cost of undercoat	Kshs 1250 per 4L tin covering 12 m ² per litre
Cost of finish coat	Kshs 1450 per 4L tin covering 14 m ² per litre
Painter	Kshs 100 per hour

Assume any other information not given.

(6 marks)

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8. Using the following data, build up a unit rate for lean concrete 1:3:6 - 20 mm aggregate in foundation (m³).

Data

Capacity of the mixer	- 200 litres
Life span of the mixer	- 5 years
Purchase value	- Kshs 1,600,000
Salvage value	- Kshs 500,000
Total interest in capital p.a.	- 40% of price of mixer
Lubrication oil	- Kshs 10 per hour
Maintenance and insurance	- 70% of annual depreciation
Diesel fuel	- 4 litres per hour at Shs 95 per hour
Efficiency	- 80%
Cement	- Kshs. 800 per 50 kg bag, density 1440 kg/m ³
Sand	- Kshs. 1200 per tonne, density 1600 kg/m ³
Ballast	- Kshs. 1400 per tonne, density 1700 kg/m ³
Cycle time	- 4 minutes
Skilled labour	- Kshs. 100 per hour
Unskilled labour	- Kshs. 50 per hour
Working hours in a year	- 2000 hrs

Assume any other information not given.

(20 marks)

1:3:6 - sand/cement (m³)
 concrete = material + labour + plant + Profit + OH

$$\text{Depreciation} = \frac{\text{Purchase} - \text{Salvage}}{\text{Life span}}$$

$$\frac{1600000 - 500000}{5 \times 2000} = \text{sh } 110$$

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Maintain - $\frac{77}{100} \times 110 = 77$ per hour

TVA - $\frac{40}{100} \times 1600000 = 640$ per hour

Lubrication oil = sh 10 per hour

Diesel fuel = 4 litres per hour $\times 95 = 380$ per hour
 $= 641$ per hour

