

2705/304

2707/304

2709/304

2710/304

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

Oct./Nov. 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 TWO questions from section A , TWO questions from section B and ONE question from either section.

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 9 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 at least TWO questions from this section.

1. (a) Define the term 'work study'. (2 marks)
- (b) Explain each of the following stages of material procurement:
- (i) material computation;
 - (ii) material security. (4 marks)
- (c) Table 1 shows the activities and durations of a construction project.
- (i) Draw an arrow network diagram and show the critical path;
 - (ii) Using analysis table, determine earliest and latest times;
 - (iii) Calculate total and free floats. (14 marks)

Table I

Activity	Predecessor	Duration (in Weeks)		
		t_0	t_m	t_p
A	—	6	4	8
B	—	2	3	4
C	—	2	9	10
D	B	5	6	13
E	C	2	4	6
F	B	3	4	5
G	A, D, E	6	3	6
H	A, D, E	4	2	6
I	C	7	3	5
J	F, H	5	4	9
K	G, I, J	8	5	8
L	G, I, J	4	3	14
M	L	11	5	11

2. (a) Explain four defenses to a negligence action. (8 marks)
- (b) Explain three types of mortgages. (6 marks)
- (c) Outline the procedure of arbitration. (6 marks)

3. (a) Sketch a line diagram to show the structure of the law court in Kenya. (7 marks)
- (b) Outline two remedies to an action of tort. (3 marks)
- (c) Explain three styles of leadership. (6 marks)
- (d) State four roles of trade unions in Kenya. (4 marks)
4. (a) Outline four books of accounts. (6 marks)
- (b) The following trail balance was extracted from the books Jomap Traders on 30th April 2016.

	Dr Shs	Cr Shs
Sales		427,000 ✓
Purchases	345,000 ✓	
Returns	17,000 ✓	20,000 ✓
Land and buildings	640,000	
Carriage in	12,000	
Carriage out	8,000	
Commissions	8,000	32,000
Stock 1 st May 2015	54,000 ✓	
Loan from Biashara bank		250,000
Discounts	16,000	19,000
Insurance	21,000	
Salaries	18,000	
Drawings	37,000	
Motor vehicles	400,000	
Furniture	70,000	
National bank loan		360,000
Debtors/creditors	82,000	95,000
Bank		67,000
General expenses	15,000	
Cash in hand	35,000	
Capital		500,000
	<u>1,770,000</u>	<u>1,770,000</u>

Stock on 31st April 2016 was valued at Ksh 75,000.

Prepare:

- (i) Trading loss account for the period ended 30th April 2016.
- (ii) Balance sheet.

(14 marks)

SECTION B: ESTIMATING AND COSTING II

Answer at least TWO questions from this section.

5. (a) State four reasons of allowing for waste on material elements. (4 marks)
- (b) Figure 1 shows a section of a storm water drain. Using the data given and ignoring cost of excavation, determine the cost of laying the precast concrete slabs and invert block drain channel.

Data

Cost of cement	Ksh 700 per 50 kg bag
Cost of sand	Ksh 1200 per m ³
Invert block drain	600 x 450 x 250 mm @ Kshs. 600
Pcc slabs	600 x 225 x 75 mm @ Ksh. 90
Thickness of mortar joints	10 mm
Murram	Ksh. 600/m ³
Length of storm water drain	70 m
Density of cement	1440 kg/m ³
Skilled labour	Ksh. 60/hour

Assume any other necessary information not given,

(16 marks)

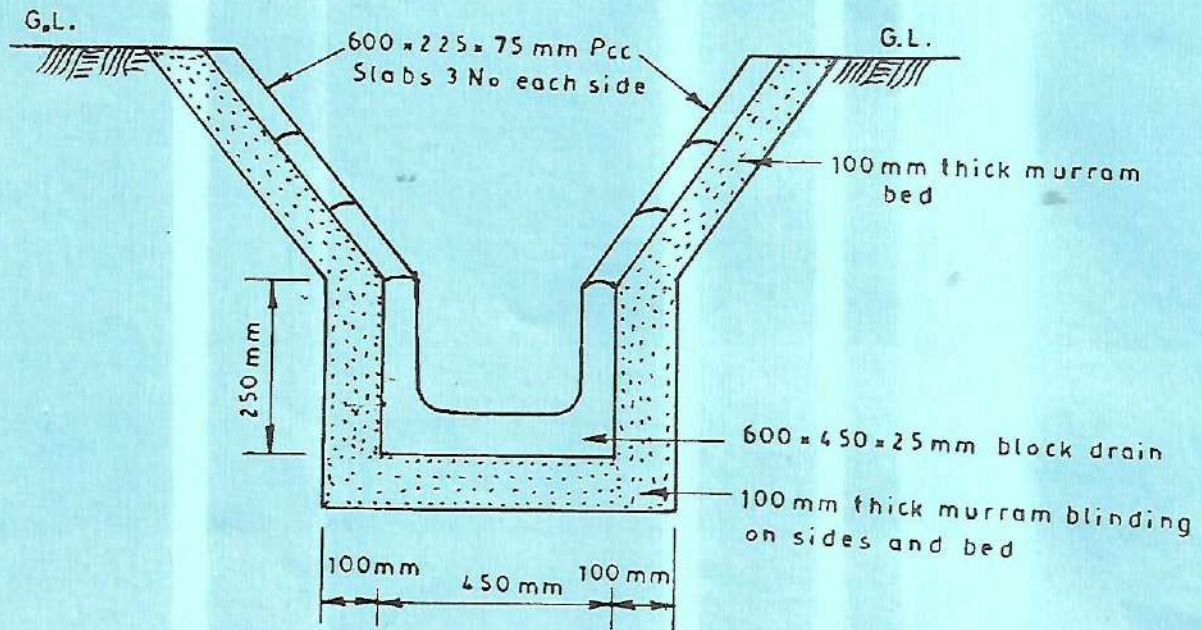


Fig.1

6. Figure 2 shows the plan of a building to be concreted using V.R.C 1:2:4 - 20 mm Agg in 150 mm thick bed. Determine the cost of concreting the floor using the following data.

- Cost of cement	Ksh. 700/50 kg bag
- Cost of sand	Kshs 1200/tonne
- Cost of Aggregates	Kshs. 1350/tonne
- Density of cement	1440 kg/m ³
- Purchase price of 300 litres mixer	Kshs. 1,350,000
- Economic life of mixer	5 years
- Repair, maintenance per year	20% of purchase price
- Resell value	Ksh. 380,000
- Annual working time	2000 hours
- Running cost (including operator)	Ksh. 300/hour
- Cycle time	6 minutes
- Efficiency	54 minutes
- Transport 3 hrs @ Ksh. 50	
- Skilled labour	Kshs. 120/hour
- Unskilled labour	Kshs. 60/hour

Assume any other necessary information.

(20 marks)

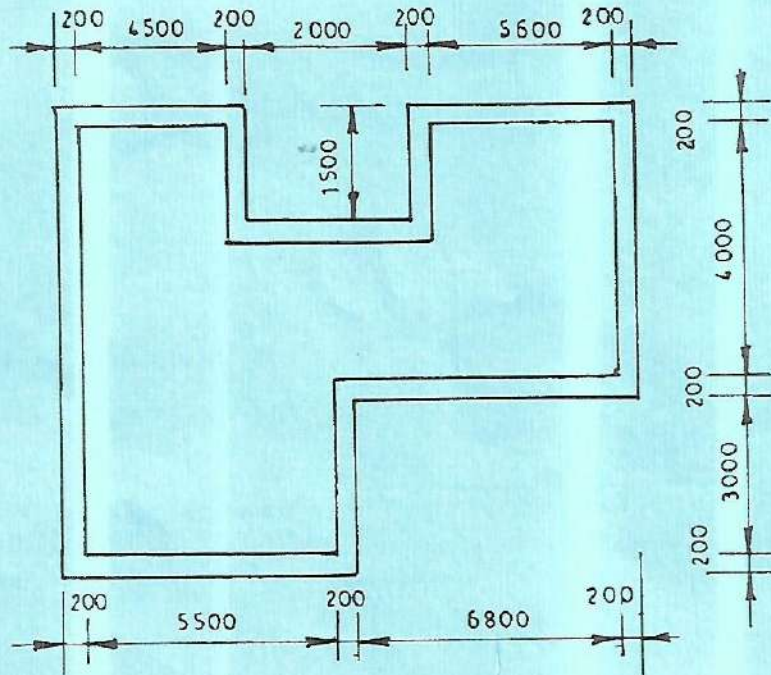


Fig.2

7. Figure 3 shows a sign board for a construction project. Estimate the cost of erecting and dismantling using the following data.

100 x 75 mm softwood timber	Kshs. 120 per metre
75 x 75 mm softwood timber	Kshs. 80/m
200 x 25 mm softwood timber	Kshs. 150 /m
Nails	Kshs. 150/kg
Prime paint	Kshs. 2500 per 4 litre tin
Oil paint	Kshs. 3000 per 4 litre tin
Concrete 1:3:6	Kshs. 7,000 per cubic metre
Excavation	Kshs. 250 per cubic metre
Skilled labour	Kshs. 120/hour
Assume any other necessary information not given.	

(20 marks)

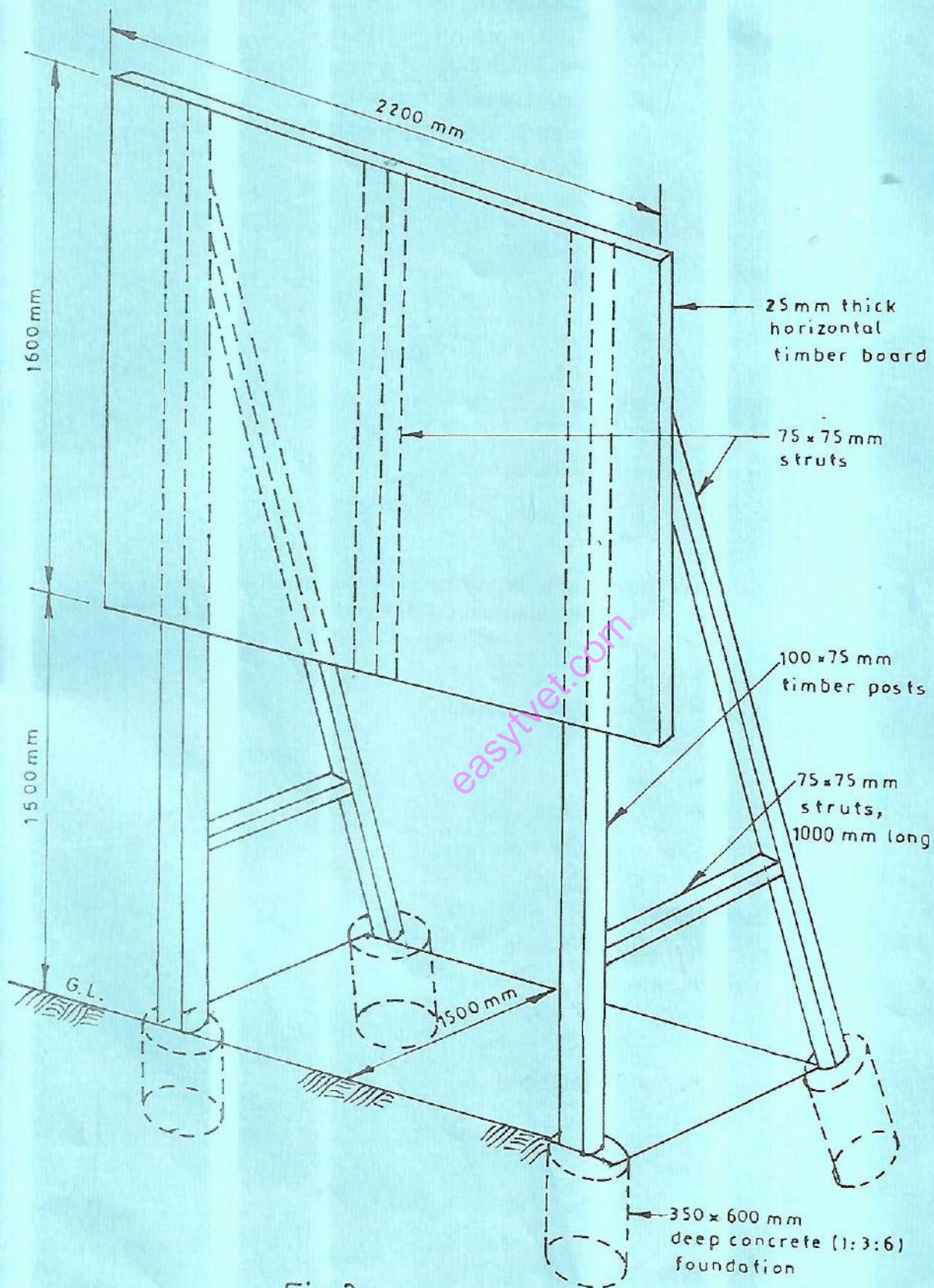


Fig.3

8. (a) Determine the cost of water for works using the following data:

Contract sum	Kshs. 100,000,000
75 mm GI pipes	Kshs. 1500 per 11.5 m long
Length of excavations from the mains to position required on site	75 m
Connection fee	Kshs. 6,900
Making good	Kshs. 2,000
Union @	Kshs. 90
Tee @	Ksh. 75
Socket @	Kshs. 60
Reducing bush @	Kshs 75
Tap @	Kshs. 600
Unskilled labour	Ksh. 60/hour

Assume any other necessary information.

(9 marks)

(b) Earth works are to be carried out for a large embankment of volume 720,000 m³ in a period of 9 months. Determine an economical arrangement of an excavator and a truck unit using the following data.:

Capacity of excavator	2 m ³ of each tipping
Capacity of truck	4 m ³
Fixed time of truck	3 minutes
One working hour is	50 minutes
Loaded speed of truck	30 km/hr
Empty speed of truck	45 km/hr
Swell of the soil	25%
Cycle time of excavator	0.5 minutes
Maximum working hours per year	2000
Haul distance	4km

Assume any other necessary information.

(6 marks)