THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

THE DEPARTMENT OF ARCHITECTURE AND CONSTRUCTION MANAGEMENT

FIRST SEMESTER EXAMINATION

THIRD YEAR BACHELOR IN BUILDING

BL 301 – QUANTITY SURVEYING & ESTIMATING 3

Room:	L2
Date:	Tuesday 8th June, 2021
DURATION:	3 Hours
Time:	08:20 – 11:20 am

Instructions to Candidates

1. You have 10 minutes to read the paper. Do not begin writing during this time.
2. Fill in the Attendance Slip with your name and student I.D. number now
3. There are six (6) pages to this exam paper including drawing attachment.
4. **There are three (3) Questions** and you are to **answer all questions**.
5. ALL ANSWERS MUST BE WRITTEN IN THE ANSWER BOOK (S) PROVIDED
6. Each question must be answered starting on a New Page.
7. Notes and Textbooks are not allowed in the Test Room.
   Only materials allowed and to be brought in by students are;
   - Calculators
   - Pens, biros and pencils

WRITE YOUR NAME AND IDENTIFICATION NUMBER CLEARLY ON THE FRONT PAGE. DO IT NOW!

TOTAL MARKS = 100 MARKS

Question 1: [12 x 4 marks]

Take of the quantities of the following items of work listed below from the drawing attached;

A. Excavate strip footing from natural ground level to reduce level..... M^3

B. Backfill beds ≤ 250mm thick with hardcore materials..... M^2

C. Backfill sides of strip footing ≥ 250mm thick with hardcore materials..... M^3

D. 25mPa plain concrete to strip footing and slab (1:2:4)..... M^3

E. 400 x 200 x 200mm thick concrete blockwall with outside joint pointed (1:4)..... M^2

F. 15mPa concrete filling to blockwall (1:3:6)..... M^3

G. 250 x 25 F11 HWD fascia boards fixed to roof framing..... M

H. 125 x 50 F11 HWD rafters @ 600mm fixed to roof framing..... M

I. 75 x 50 F11 HWD purlin @ 600mm centres fixed to roof framing..... M

J. Apply 1 coat masonry sealer and 1 coat masonry paint to internal walls..... M^2

K. Prepare and apply 1 undercoat and 2 finish coat paint to ceiling and soffit linings..... M^2

L. 200 x 200 x 6mm ceramic tiles fixed with adhesives and grout to 4mm joints to slab..... M^2

Question 2: [12 x 3 marks]

Buildup the unit rates for the listed items of work in Question 1

Question 3: [1 x 16 marks]

Create and complete the sample Bills of Quantities (BOQ) for the items of work

DATA SHEET

1. Data to build up the Unit Rates

Ground Works (Item A)
Hand Excavation
Labour:
1 x Tradesman @ K5.00/hr assisted by 6 x Labourers @ K3.60/hr
Output: (refer to Table 1)
Profit and on-cost: 10%

Backfill (Item B and C)
Materials:
Hardcore materials or similar delivered to site cost K50.00/m^3
Waste to materials, 10%
Labour:
1 x Tradesman @ K5.00/hr assisted by 6 x Labourers @ K3.60/hr
Output: (refer to Table 2)
Profit and on-cost: 10%

Concrete Works (Item D)
Materials: (refer to Table 3)
40kg cement per tonne cost K300.00 includes delivery to site
Sand/m^3 cost K40.00 delivered to site
Aggregates/m^3 cost K50.00 delivered to site
Waste to all materials, 10%
Unloading + stacking, K2.00
Labour:
1 x Tradesman @ K5.00/hr assisted by 6 x Labourers @ K3.60/hr
Labour Output: (refer to Table 4)
Plant 10/7 mixer rate: K30.00/hr
Plant output: (refer to Table 4)
Profit and on-cost: 10%

Masonry (Item E)
Materials:
Cost to deliver 100 blocks includes delivery to site cost K350.00
Waste to concrete blocks, 10%
Materials for mortar: (refer to Table 4)
40kg cement per tonne cost K300.00 includes delivery to site
Sand/m^3 cost K40.00 delivered to site
Waste to sand, 5%
Unloading + stacking, K2.00
Labour:
2 x Blocklayer @ K5.00/hr assisted by 3 x Labourers @ K3.60/hr
Labour Output: (refer to Table 5)
Profit and on-cost: 10%

Filling in Masonry walls (Item F)
Materials: (refer to Table 3)
Price of 40kg cement per tonne cost K300.00 includes delivery
Sand/m^3 cost K40.00 delivered to site
Aggregates/m^3 cost K50.00 delivered to site
Waste to all materials, 10%
Unloading + stacking, K2.00
Labour:
2 x Blocklayer @ K5.00/hr assisted by 3 x Labourers @ K3.60/hr
Labour Output: (refer to Table 5)
Profit and on-cost: 10%

Woodworks (G,H and I)
Materials:
125 x 50 timber cost K850.00/100m includes delivery
75 x 50 timber cot K600.00/100m includes delivery
250 x 25 timber cost K450.00/100m includes delivery
12mm plysheet (size 2.4m x 1.2m) cost K250.00/sheet includes delivery
Nails to fix at 2.5kg @ K30.00/10kg includes delivery
Waste to all materials, 10%
Unloading + stacking, K2.00
Labour:
1 x Tradesman @ K5.00/hr assisted by 2 x Labourers @ K3.60/hr
Labour Output: (refer to Table 5)
Profit and on-cost: 10%

Painting (Item J and K) based on $100m^2$ calculations
Materials: (refer to Table 6)
4Litre masonry sealer paint cost K150.00 delivered to site
4Litre masonry paint cost K200.00 delivered to site
4Litre undercoat paint cost K250.00 delivered to site
4Litre finish coat paint cost K300.00 delivered to site
Sand paper 180 grit, cost K0.15/sheet
Waste to materials, 10%
Unloading + stacking, K2.00
Labour:
2 x Painter @ K5.00/hr assisted by 3 x Labourers @ K3.60/hr
Labour Output: (refer to Table 6)
Profit and on-cost: 10%

Finishes (Item L) based on 100 tiles calculations
Materials:
200 x 200 x 6mm ceramic tiles of 25tiles/pack.
Cost at K10.00/pack of 100 tiles delivered to site
Adhesive to fix, 0.6 Litres cost K40.00/10 Litres delivered to site
Grout to fix, 0.5kg cost K50.00/10kg delivered to site
Waste to materials, 10%
Unloading + stacking, K2.00
Labour:
1 x Tiler @ K5.00/hr assisted by 2 x Labourers @ K3.60/hr
Labour Output: (refer to Table 5)
Profit and on-cost: 10%

2. Tables

Table 1: Hours to Excavate 1 m^3 by Hand for Ordinary Soil

Depth stage (m)	*To excavate and get out*	*To throw the soil out*	*To clear the sides of debris*	*Totals Hours*
≤1.0	2.4	0.0	0.0	2.4
> 1.0 to ≤2.0	2.4	1.4	1.4	5.2
> 2.0 to≤ 3.0	2.4	2.8	1.4	6.6
> 3.0 to ≤4.0	2.4	5.2	1.4	8.0

Table 2: Hours to Backfill 1 m^3 by hand for Ordinary Soil

Filling hardcore in beds ≤ 250mm	1.15hr/m^3
Filling hardcore in beds > 250mm	1.30hr/m^3

Table 3: Approximate quantities of dry materials required per m^3 of fully Compacted Concrete

Nominal Mixes (20mm)	Cement (Tonnes)	Sand (m^3)	Aggregates (m^3)
1 : 3 : 6	0.22	0.45	0.90
1 : 2 : 4	0.32	0.43	0.86

Table 4: Approximate quantities of dry materials required per m^3 of Mortar

Composition By Volume	Cement (Tonnes)	Sand (m^3)
1:3	0.50	1.00
1:4	0.40	1.12

Table 5: Labour / Plant Outputs

Concrete works	Outputs
Mixing	K5.20/hr
Transporting	K4.40/hr
Placing	K5.50/hr
10/7 concrete mixer (plant)	4m^3/hr

Masonry works	Outputs
Laying of blocks	0. 8m^2
Pointing of blocks	2.5m^2

Finishes (ceramic)	Output
200 x 200 x 6mm	1.5hr/100tiles

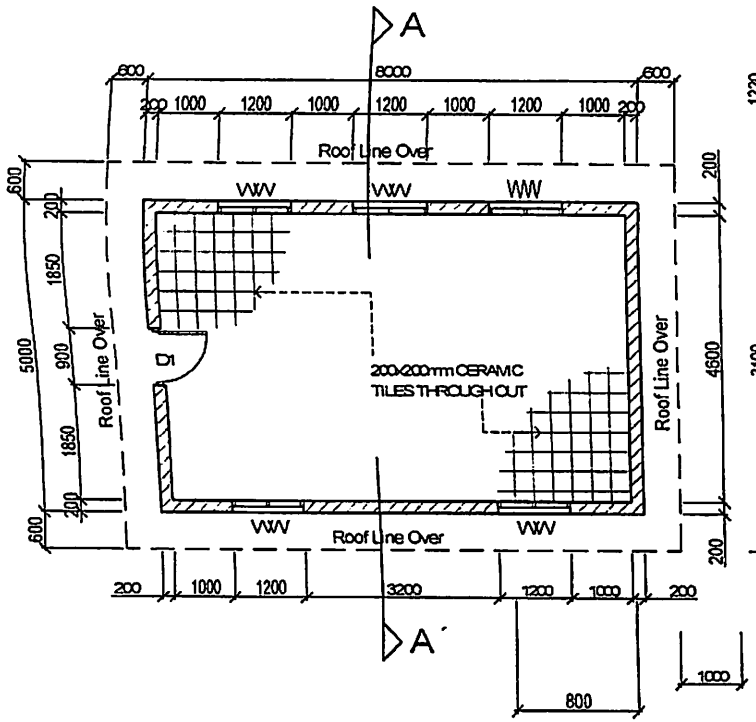
Woodwork	Outputs
125 x 50	0.24hr/m
75 x 50	0.27hr/m
250 x 25	0.20hr/m
12mm plysheet	0.20hr/m^2

Filling in blocks	Output
Corefilling	1.2m^2/hr

Table 6: Painting Outputs

Covering capabilities (per 100m^2)		
Undercoat	Wood	7.2 litres
Finishing Coat	Wood	8.3 litres
Masonry sealer	Concrete	25 litres
Masonry paint	Concrete	29 litres
Sandpaper	Preparing	8 sheets

Labour Outputs (Hr/100m^2)	
Preparation of wood surface	4.5 hr
Undercoat to wood surface	5.0 hr
Finish coat to wood surface	4.5 hr
Masonry sealer to concrete	6.0 hr
Masonry paint to concrete	5.8 hr

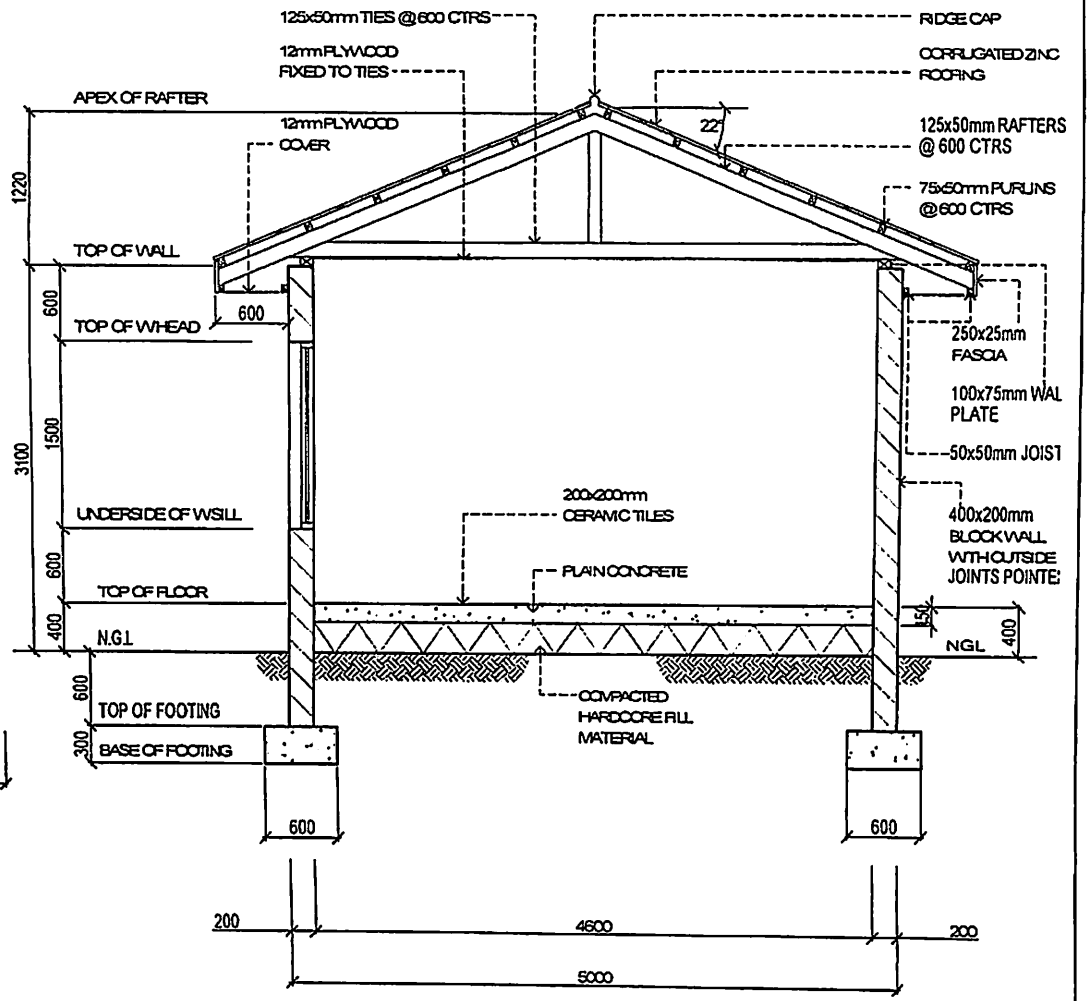


D1 = SIMPLE FLUSH DOOR IN 100x50mm HW FRAME. DOOR SIZE 2100x900mm

WW= 100x50mm WINDOW FRAMES FIXED TO TO THE WALL DIRECTLY WITH 10No SOCKET BLADES LOUVRE FRAMES

FLOOR PLAN

SCALE 1:100



SECTION A-A

SCALE 1:100

PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY DEPARTMENT OF ARCHITECTURE & CONSTRUCTION MANAGEMENT	PROJECT TITLE: SAMPLE DRAWING	LECTURER: MR. POMOSO	COURSE STREAM: CONSTRUCTION MANAGEMENT