

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

THE DEPARTMENT OF ARCHITECTURE AND CONSTRUCTION MANAGEMENT

SECOND SEMESTER EXAMINATION

SECOND YEAR DIPLOMA IN BUILDING

CM 220 – QUANTITIES & ESTIMATING II

Room: L2
Date: Wednesday 3rd November 2021
Duration: 3 Hours
Time: 12:50 – 4:00 pm

Instructions to Candidates

You have 10 minutes to read the paper.
Do not begin writing during this time.

Fill in the Attendance Slip with your name and student I.D. number now

There are four Questions and you are to answer all questions.

**ALL ANSWERS MUST BE WRITTEN IN THE ANSWER BOOK (S) PROVIDED
and ON THE APPENDIX 2 AND 3.**

Each question must be answered starting on a New Page.

Notes and Textbooks are not allowed in the Test Room.
Only materials allowed and to be brought in by students are;

- Calculators

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

TOTAL MARKS = 100 MARKS

Question One**[40 marks]**

Take off the quantities of the following items only from the attached drawings in Appendix 1.

- (i) Excavation for pad footing [10 marks]
- (ii) Excavation for strip footing [10 marks]
- (iii) Concrete to pad footing [10 marks]
- (iv) Concrete to strip footing [10 marks]

Question Two**[10 marks]**

Calculate the all-in-cost of 2400mm x 1200mm x 6mm thick plywood required to construct 1m² of wall.

Data:

- (i) Price per 100 plywood ex-works cost K8000.00
- (ii) Delivery to site cost K100.00
- (iii) Unloading and stacking i.e. 1½ hours labourer @ K4.50
- (iv) Waste (breakage and cutting), 10%

Question Three**[40 marks]**

- (a) Calculate the labour constant for following item of work; (10 marks)
- (i) It takes 4 weeks for a gang of 1 tradesman, 2 trade assistance, 2 skilled labourer and 2 unskilled labourer to construct a concrete slab of dimension 50m x 30m wide x 200mm thick. The strength of the concrete is 20 Mpa. (Note: 1 week = 8hours/day +4hours).
 - (ii) It takes 8 weeks for a gang of 1 tradesman, 3 trade assistance, 3 skilled labourer and 3 unskilled labourer to construct 60 number of concrete columns of dimension 600mm x 600mm x 4000mm high. The strength of the concrete is 30 Mpa. (Note: 1 week = 8hours/day +4hours).
- (b) Calculate the charge-out-rate of the following operatives by completing the table in Appendix 2. (20 marks)
- (i) Tradesman carpenter with an hour rate of K14.00
 - (ii) Trade Assistance Carpenter with an hour rate of K8.50
 - (iii) Skilled Labourer with an hour rate of K6.50
 - (iv) Unskilled labourer with an hour rate of K5.50
- (c) Calculate the gang cost of; (10 marks)
- (i) Question 3 (a) (i)
 - (ii) Question 3 (a) (ii)
- (d) Calculate the labour cost for constructing; (10 marks)
- (i) Concrete slab in Question 3 ((a) (i)) using charge out rate in Question 3 (b)
 - (ii) Concrete beams in Question 3 ((a) (ii)) using charge out rate in Question 3 (b)

Question Four

[10 marks]

Calculate the hourly cost of owning and operating a concrete mixer by completing the table in Appendix 3 based on the following data;

Purchase price = K40,000

Hours worked per annum = 1100

Fuel @K3.70 per litre

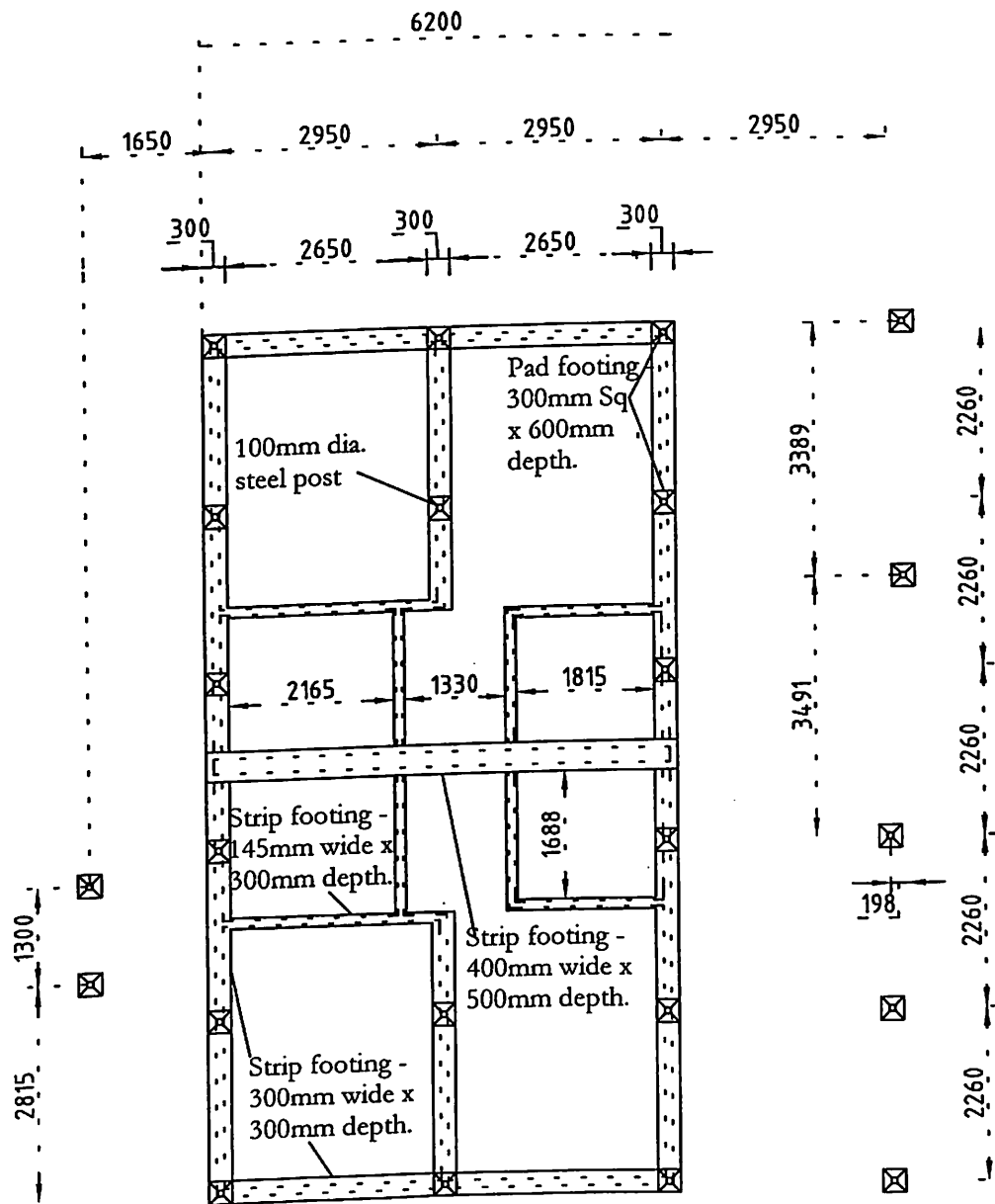
Life of mixer = 4 years

working efficiency = 85%

Lubricant oil, grease @ K6.50 per litre

Appendix 1

Attached Drawing



Footings Plan Scale 1:100
 All measurement in Millimetres

Appendix 2 [20 Marks]

Calculate the charge-out-rate of the following person

	Carpenter		Trade Assistance	Skilled labourer	Unskilled labourer
GRADE:					
OUR RATE:					
Wages per 42 hour week = K					
Annual wage = week wage x 52					
Workers compensation 3 % = K					
TOTAL WAGE COST PER ANNUM = K					
TOTAL WORKING HOURS PER ANNUM = 42 X 52 =	2184	Hrs			
DEDUCTIONS					
Weather allowance, 2% =	43.68	Hrs			
Annual Leave, 3 weeks =	126	Hrs			
Public Holiday, 1 week =	42	Hrs			
Sick Pay, 1 week =	42	Hrs			
Compassionate leave (That is 24 hrs) =	24	Hrs			
Rest Pause, 2% =	43.68	Hrs			
Long Service leave, 3% =	65.52	Hrs			
TOTAL DEDUCTIONS =	<u>386.88</u>	Hrs			
/ =	<u>387</u>	Hrs			
ACTUAL HOURS WORKS WORKED PER ANNUM =	1797	Hrs			
HOURLY COST = TOTAL COST / ACTUAL HRS =					
ALLOWANCE FOR OVERHEADS AND PROFITS					
Hourly Rate =					
% allowance for Overheads					
3-TOTALS =					
% allowance for profit					
TOTAL RATE TO INCLUDE ALL ITEMS - CHARGE OUT					
RATE =					

Appendix 3 [15 Marks]

Calculate the hourly cost of Owning and operating a concrete mixer based on the following data:

Purchase price _____
 Interest rate _____ X %
 Life of mixer _____ years
 Scrap value at end of life Nil
 Hours worked per annum _____ hours
 Working efficiency _____

Cost of Owning

Annual depreciation = _____ -----> _____
 Interest on capital, Total repayment is K50,000
 _____ -----> _____
 Repairs and maintenance, 20% of annual depreciation -----> _____
 Annual Cost of Owning -----> _____
 Hourly Cost of owning -----> _____

Operating Cost

Fuel per 8-hr day, say 7 litres @ K _____ = _____
 Lubricating Oil, grease, say 5 litres per week, 5 litres @ K _____
 = _____
 Therefore, Lubricants per day of 5 working days = _____
 Lubricate and fuel per day = _____
 Fuel and Lubricant per hour of the 8 hours = -----> _____
 Total -----> _____

Working efficiency= _____
Therefore All-in-cost per hour is ----->