UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2012/2013

COURSE NAME	:	CONSTRUCTION COST ESTIMATION
COURSE CODE	:	BPD 31003
PROGRAMME	:	3 BPC
EXAMINATION DATE	:	JUNE 2013
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Instruction: Use information in **Table 1** to answer **Q1** until **Q3**. Any other assumptions can be made if no data given.

Table 1 : Information for Estimating Works

Materials	
Cost of cement per bag (50kg)	RM 18.00
Cost of 1 tonne sand	RM 120.00
Cost of 1 tonne aggregate	RM 150.00
Cost of 1 brick	RM 0.30
Cost of 1 litre varnish	RM 5.70
Cost of 1 kg putty	RM 9.50
Cost of 1 tin primer coat (5 litre)	RM 45.00
Cost of 1 tin undercoat (5 litre)	RM 60.00
Cost of 1 tin finish coat (5 litre)	RM 90.00
Cost of 1 piece sand paper	RM 1.00
Mortar required per $1m^2$ (inclusive wastage) for brick works	$0.05m^3$
Total use of bricks for $1m^2$	118 pieces
B. Machine and Equipment	
Cost of rent mixer for 1 day	RM 110.00
Cost of diesel to mixer for 1 day	RM 24.00
Cost of lubrication oil to mixer for 1 day	RM 11.20
C. Labour	
Worker wages for 1 day:	
- Skilled workers	RM 60.00
- Unskilled workers	RM 40.00
Cost of unloading 1 bag of cement	RM 1.00
Labour output:	
- Laying of 1 hour brick	120 pieces
D. Additional Percentage of Shrinkage and Wastage	
Mortar	33.33%
Brick works	3%
Concrete works	50%
Percentage of profit and overhead	10%

Q1 Factors involved in the build-up of a unit rate of brick works are quantity of bricks, quantity of mortar, cutting and waste as well as labour laying bricks.

Refer to **Table Q1(a)** and **Table Q1(b)** in **Appendix I**, calculate build-up rates per m^2 for 215mm thick brickwall in clay brick in composition cement and sand (1:3) mortar as specified, laid in English Bond using machine with output of 10/7. This produces approximately $1.20m^3$ of mortar in 1 hour.

(22 marks)

Q2   Among factors affecting cost of painting works are types of surface, types of paint and sizes of area.

Refer to **Table Q2(a)** and **Table Q2(b)** in **Appendix II**, calculate build-up rates per m^2 for:

(a)   One coat metallic primer, one coat undercoat and two coats gloss finish to general surfaces of steel not exceeding 150mm girth externally.

(11 marks)

(b)   Knotting, stopping one coat primer, one coat undercoat and two coats gloss finish to general surfaces of wood not exceeding 150mm girth internally.

(16 marks)

Q3   There are three main factors to be considered in the build-up of a unit rate for concrete works. They are materials, method of mixing, and site transportation and placing.

(a)   Explain any **TWO (2)** of the main factors.

(4 marks)

(b)   Refer to **Table Q1(a)** in **Appendix I**, calculate build-up rates per m^3 for vibrated reinforced concrete Grade 20 (1:2:4 – 19mm aggregate) in beams using machine with output of 7/5. This produces approximately 3.50 m^3 of mixed concrete in 1 hour.

(17 marks)

Q4   It is common practice in construction project to install a glass after wood sash is set in the wall. This is to reduce the danger of breakage.

(a)   Describe **THREE (3)** types of quality for sheet glass used in construction works.

(6 marks)

(b)   Explain factors affecting the cost of glass.

(8 marks)

Q5   Specifications, contract drawings, bill of quantities, conditions of contract, and information for tenderers are part of contents in a tender document.

Analyse **ALL** the contents.

(16 marks)

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Table Q1(a) : Machine output for mixing cement and sand as well as concrete works

Machine size	Labour	Output/hour (m^3)	Diesel/hour (litre)	Lubrication/hour (litre)
7 / 5	1 operator, 3 unskilled	2.25	1.60	0.06
10 / 7	1 operator, 4 unskilled	3.25	1.80	0.07
14 / 10	1 operator, 4 unskilled	4.50	2.10	0.08
18 / 12	1 operator, 6 unskilled	5.50	2.40	0.10

Table Q1(b) : Labour output for brick work

Description	Bricklayer $(hour/m^2)$	Unskilled Worker $(hour/m^2)$
Half brickwall for common brick	1.00	0.35
One brickwall for common brick	1.75	0.70

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Table Q2(a) : Data of oil paint and varnish

Description	Surface Types (100m²)	
	Wood	Steel
Primer coat	8.00 litre	7.00 litre
Undercoat	7.00 litre	7.00 litre
Finish coat	7.00 litre	7.00 litre
Varnish	5.50 litre	-
Wood cleaning	0.75 litre	-
Wood filling	2 kg putty	-
Sand paper	10 pieces	-

Table Q2(b) : Additional percentage to material and labour costs for painting works

Description	Quantity of paint	Labour cost
General surfaces not exceeding 150mm girth.	10%	30%
General surfaces exceeding 150mm but not exceeding 300mm girth.	5%	15%
Pipe not exceeding 150mm girth.	15%	35%

-END OF QUESTION-