



**UTHM**

Universiti Tun Hussein Onn Malaysia

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2017/2018**

COURSE NAME : CONSTRUCTION COST ESTIMATION  
COURSE CODE : BPD 31003  
PROGRAMME CODE : BPC  
EXAMINATION DATE : JUNE / JULY 2018  
DURATION : 3 HOURS  
INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

**Q1** Excavation works is defined as the removal of earth, rock or other materials in connection with construction or demolition work using tools, machinery or explosives to form an open face or hole. Excavation works include any earthwork, trenching, shaft, tunnel or underground working.

(a) Discuss **FIVE (5)** factors affecting the cost of excavation works. (10 marks)

(b) Describe planking and strutting in excavation works. (8 marks)

**Q2** Outline **TWO (2)** factors affecting the cost of in-situ concrete. (10 marks)

**Q3** Refer to **Table 1, Table Q3(a), Table Q3(b), and Table Q3(c):**

(a) Calculate build-up rates per m<sup>2</sup> for 25mm thick cement and sand (1:3) paving with steel trowelled finish to floor level or to falls not exceeding 15° from horizontal on concrete base. (16 marks)

(b) Calculate build-up rates per m for 25mm cement and sand (1:3) skirting 100mm high with rounded top edge and cove at bottom to wall on brickwork base (Price of mortar is based on answer of **Q3(a)**). (6 marks)

(c) Calculate build-up rates per m<sup>2</sup> for 16mm thick cement and sand (1:6) plaster to wall with steel trowelled finish on brickwork base. (18 marks)

**Q4** Refer to **Table 1, Table Q4(a), Table Q4(b), Table Q4(c), and Table Q4(d):**

Calculate build-up rates per m<sup>2</sup> for;

(a) Knotting, stopping, one coat primer, one coat undercoat and two coats gloss finish to general surfaces of wood not exceeding 150mm girth internally. (17 marks)

(b) One coat metallic primer, one undercoat and two coats gloss finish to general surfaces of steel over 300mm girth externally. (10 marks)



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**Q5** Refer to **Table 1**, **Table Q5(a)**, **Table Q5(b)** and **Table Q5(c)**:

Calculate build-up rates per m<sup>2</sup> for 8mm thick ready cut of tinted float glass to metal with clips and putty in panes 0.50 – 1.00 m<sup>2</sup>.

(5 marks)

**-END OF QUESTIONS-**

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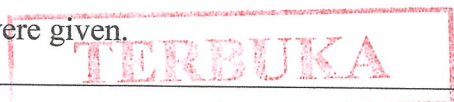
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**Table 1: Information for estimating works**

<b>A. Materials Cost</b>	
1 bag cement (50kg)	RM 19.50
Fine sand per m <sup>3</sup>	RM 45.00
Syelek per litre	RM 6.00
Putty per 1 kg	RM 9.50
Paint (Primer) per tin (5 litre)	RM 50.00
Paint (Undercoat) per tin (5 litre)	RM 60.00
Paint (Finish) per tin (5 litre)	RM 90.00
Sand paper per sheet	RM 1.00
Tinted float glass (8mm) per m <sup>2</sup>	RM 43.00
Additional Information:	
• Clips for glass installation	RM 1.20
<b>B. Machine and Equipment Cost</b>	
Mixer rental per day	RM 100.00
Diesel per litre	RM 2.10
Lubrication oil use per day	RM 20.00
Additional Information:	
• Diesel use for mortar	1.10 litre
• Lubrication oil use for mortar	0.04 litre
<b>C. Labour Cost</b>	
Worker wages per day:	
• Skilled worker and Operator	RM 60.00
• Unskilled worker	RM 40.00
Labour output:	
• Mortar mixing per hour	1.25 m <sup>3</sup>
Additional Information:	
• Brush for painting	3%
<b>D. Additional Percentage of Shrinkage and Wastage</b>	
Mortar	33.33%
Percentage of profit and overhead	11%

**Instruction:** Any other assumptions can be made if no data were given.



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**Table Q3(a): Labour output for floor paving**

Types of Paving (20mm – 25mm thick)	1 Spreader and 1 Unskilled Worker (hour/m <sup>2</sup> )
Cement	0.30
Granolithic	0.35
Screeded	0.25
Trowelled	0.30

**Table Q3(b): Labour output for skirting**

Height of Skirting (mm)	1 Spreader and 1 Unskilled Worker	
	Cement and Sand (hour/m)	Granolithic (hour/m)
75	0.35	0.45
100	0.38	0.50
125	0.41	0.55

**Table Q3(c): Labour output for plastering work**

Position	1 Plasterer and 1 Unskilled Worker (hour/m <sup>2</sup> )
Wall	0.40
Ceiling	0.50

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**Table Q4(a): Requirements for wood and steel surfaces**

Description	Surface Types (100m <sup>2</sup> )	
	Wood	Steel
Primer coat	8 litre	7 litre
Under coat	7 litre	7 litre
Finish coat	7 litre	7 litre
Varnish	5.5 litre	-
Cleaning the surface	0.75 litre syelek	-
Stuffing the surface	2 kg putty	-
Sand paper	10 sheets	-

**Table Q4(b): Coordination of paint for difficult surfaces**

Description	Additional To Quantity of Paint
General surfaces not exceeding 150mm girth.	10%
General surfaces exceeding 150mm but not exceeding 300mm girth.	5%
Pipe not exceeding 150mm girth	15%
Pipe exceeding 150mm but not exceeding 300mm girth	10%
Pipe exceeding 300mm girth.	5%

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**Table Q4(c): Labour output for painting wood and steel surfaces**

Description	Painter (hour/100m <sup>2</sup> )	
	Wood Surface	Steel Surface
Cleaning the surface	3	-
Stuffing the surface	3	-
Rubbing with sand paper	3	-
Painting primer coat	8	8
Painting under coat	8	8
Painting finish coat	9	9

**Table Q4(d): Coordination of labour cost for difficult surfaces**

Description	Additional To Labour Cost
General surfaces not exceeding 150mm girth.	30%
General surfaces exceeding 150mm but not exceeding 300mm girth.	15%
Pipe not exceeding 150mm girth	35%
Pipe exceeding 150mm but not exceeding 300mm girth	20%
Pipe exceeding 300mm girth.	5%

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**Table Q5(a): Labour output for glass installation to window and door**

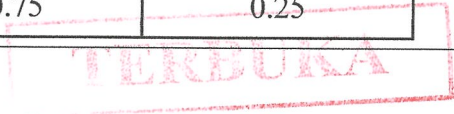
Size of glass (m <sup>2</sup> )	Glazier (hour/m <sup>2</sup> )		
	Fixing to wood with screw beads	Fixing to wood with putty	Fixing to metal with clips and putty
≤ 0.10	1.45	1.35	1.65
0.10 – 0.50	1.10	1.00	1.25
0.50 – 1.00	0.90	0.80	1.00
> 1.00	0.70	0.65	0.75

**Table Q5(b): Percentage (%) of waste on glass per cut**

Material	Additional cost
Ready cut of glass	3%
Cut on site	10%

**Table Q5(c): Putty for glass installation**

Size of glass (m <sup>2</sup> )	Putty (kg/m <sup>2</sup> glass)	
	Fixing with putty	Fixing with screw beads
≤ 0.10	3.00	1.00
0.10 – 0.50	2.00	0.75
0.50 – 1.00	1.00	0.33
> 1.00	0.75	0.25



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