[OCD012]

UNIVERSITY OF BOLTON

OFF CAMPUS DIVISION

WESTERN INTERNATIONAL COLLEGE

BENG(HONS) CIVIL ENGINEERING

TRIMESTER ONE EXAMINATION 2021/2022

CONSTRUCTION MANAGEMENT

MODULE NO. CIE5002

Date: Thursday 6th January 2022 **Time : 10:00 – 13:00**

INSTRUCTIONS TO CANDIDATES:

There are FIVE questions in this paper.

Answer ALL FIVE questions.

All questions carry equal marks.

Marks for parts of questions are shown in brackets.

All working must be shown. A numerical solution to a question obtained by programming an electronic calculator will not be accepted.

Marks for parts of questions are shown in the brackets.

This examination paper carries a total of 100 marks.

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Q1.

a) What entities should be considered when calculating the net cost of a pretender document?

(8 marks)

b) As a part of the substructure work for Al Qasimia University Sharjah project, it is required to carry out an excavation of depth 7m below ground level. The bottom cross section is 25m x 50m and the top cross section is 30m x 60m with sides battered back 45° to the horizontal. Soil in the site is a mix of sand and gravel. It is decided that for the excavation operation, a dragline with a 1.25m^3 bucket and a working output of 150m^3 (loose) per hour in sand and gravel is to be used. The hiring rate for this equipment is AED 225 per hour. The manpower requirement for this excavation operation and their hourly rates are summarized in **Table 1.** Determine the total cost and cost per m^3.

(12 marks)

Table 1

Man Power	**Hourly Rates**
Dragline Operator	AED 42.50
Mechanic Fitter	AED 32.50
Banksman	AED 30.00
Labourer	AED 30.00

Total 20 marks

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Q2.

It has been estimated that the construction industry could save hundreds of millions of pounds each year by utilising better waste management techniques. Reducing site wastage and exploring the potential for recycling are being more seriously investigated by the industry's contractors.

a) Provide any six common causes of materials waste on construction sites.

(3 marks)

b) Analyze how **'Quality Control process**' may improve the control of materials wastage and thus reduce the amount of money lost on a project

(4 marks)

c) Barjeel is the new Green Building Regulations of Ras Al Khaimah. One of the goals of Barjeel Code is 'Promotion of sustainable building materials and reduction of waste'. Briefly explain the requirements, guidelines and submission stage evidences of both Construction and Operational waste management.

(13 marks)

Total 20 marks

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Q3.

a) Evaluate the method of communication employed in a construction industry and state its advantages and disadvantages.

(8 marks)

b) The lack of effective communication is likely to be the main single contributory factor to many of the problems faced in site. Therefore, more emphasis is directed toward the site administration aspects of communication. Briefly explain the minimum requirements considered for the efficient management of the following:

i. Site Office Administration

(4 marks)

ii. Site Meeting

(4 marks)

iii. Site Diary

(4 marks)

Total 20 marks

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Q4.

The information tabulated in **Table 2** details the sequence of activities for each of 24 units to be constructed for a Jetty. Optimum gang sizes and total man-hours per activity for each unit are extracted from the contractor's method of statement.

Table 2

Activity	**Man-hours per activity (per unit)**	**Optimum gang size per activity (per unit)**
A-Piling	375	3
B-In situ Beams	600	6
C-In situ Decks	840	5
D-Install Pipework	300	2

The contractor's normal working week is Monday to Friday, eight hours per day, and the target rate of completed construction is 3 units per week. A minimum 4 day buffer time is considered appropriate for this project and it is assumed that all operations are sequential.

(a) Complete the line of balance calculation sheet provided as **Table4** provided on **Pages 7 and 8** for activities A to D inclusive.

(12 marks)

(b) Produce a fully annotated Line of Balance Schedule on the graph paper provided (use landscape orientation), and state the minimum duration for completion of the Jetty.

(8 Marks)

Total 20 marks

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Q5

A network program is to be set out for the construction of a building project. The client requires information on the optimum duration (least cost) for the project. **The details on Table 3** list the duration and direct cost for each activity under both normal and crashed conditions. Assume the indirect cost per day is **£** 900/-

a) Sketch the network program based on the data given in the **Table 3**

(5 marks)

b) Identify the Critical path in the network and the duration of the project.

(2 marks)

c) Calculate the cost slope for each activity and indicate its ranking

(2 marks)

d) Establish the minimum cost of the project

(11 marks)

Table 3

Activity	Preceded By	Normal		Crash	
		Duration (days)	Cost (£)	Duration (days)	Cost (£)
A	-	6	2,500	5	3,100
B	-	10	7,000	7	8,200
C	B	6	6,500	5	7,000
D	-	12	10,000	10	11,800
E	A	12	4,200	9	5,700
F	C, D	6	8,200	5	8,500
G	E,F	5	5,200	4	6,000
H	C,D	8	7,500	5	8,700
I	G,H	4	5,600	3	6,000

Total 20 marks

END OF QUESTIONS
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Table 4

LINE OF BALANCE CALCULATION SHEET .... OF ....

PROJECT : ....

Minimum Buffer Time selected .... days Prepared By .... Date ....

PLANNED INFORMATION											CALCULATED INFORMATION				
				Number of Men used								Summary			
												First Unit		Last Unit	
Activity Ref & Description	Manhours per Unit	Handover rate/week	Total Manhours/Week	Planned ÷40 hr/week	Optimum Gang Size	No. of Gangs to be used	No. of Men used	Actual rate of Construction	Duration for one Unit	Actual Duration of work	Calculation of Start & Finish dates	Start	Finish	Start	Finish

TABLE 4 CONTINUES OVER THE PAGE…
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TABLE 4 CONTINUED…..

LINE OF BALANCE CALCULATION SHEET ………… OF ……………

PROJECT : ……………………………………………………………………

Minimum Buffer Time selected ………………… days Prepared By ……………………………… Date ……………………

PLANNED INFORMATION											CALCULATED INFORMATION				
Activity Ref & Description	Manhours per Unit	Handover rate/week	Total Manhours/Week	Number of Men used				Actual rate of Construction	Duration for one Unit	Actual Duration of work	Calculation of Start & Finish dates	Summary			
				Planned ÷40 hr/week	Optimum Gang Size	No. of Gangs to be used	Actual No. of Men used					First Unit		Last Unit	
												Start	Finish	Start	Finish

END OF PAPER