

UNIVERSITY OF BOLTON

WESTERN INTERNATIONAL COLLEGE FZE

BENG (HONS) CIVIL ENGINEERING

SEMESTER TWO EXAMINATION 2018/2019

CONSTRUCTION MANAGEMENT

MODULE NO: CIE5002

Date: Tuesday 21st May 2019

Time: 10.00am - 1.00pm

INSTRUCTIONS TO CANDIDATES:

There are FIVE questions on this paper.

Answer ANY Four questions.

All questions carry equal marks.

Marks for parts of questions are shown in brackets.

This examination paper carries a total of 100 marks.

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

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Question 1

(a) Effective communication is the building block of an organization. It is the responsibility of the originator of the communication to ensure that the message has been received, understood and acted upon. Identify and explain the various points that should be carefully considered in order to achieve this.

(6 marks)

(b) Evaluate the methods of communication employed in the construction industry and state its advantages and disadvantages.

(10 marks)

(c) Effective communication is something which helps the managers to perform the basic functions of management- Planning, Organizing, Motivating and Controlling. Analyse barriers to communication by providing appropriate examples and discuss how they may be overcome.

(9 marks)

Total 25 marks

Question 2

Table Q2 lists the duration and direct cost for each activity in the network programme for the construction of a small residential villa. The client, for whom the contractor is working, requires knowing the variation in cost for the project, related to the overall contract duration stated in the tender documents.

Question 2 continued over to the next page

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Question 2 continued

Table Q2

i-j	Normal Duration (weeks)	Normal cost £	Crash Duration (weeks)	Crash cost £
1-2	4	500	3	750
2-3	4	100	2	300
2-4	2	200	2	200
2-5	5	600	4	760
3-6	6	700	5	830
4-8	4	200	3	300
5-7	7	140	5	200
6-9	4	200	2	300
7-8	2	80	2	80
8-9	1	100	1	100
9-10	7	600	6	670

- (a) Sketch the network program based on the data given in the **TableQ2**.
 (6 marks)
- (b) Identify the Critical path in the network and the duration of the project.
 (3 marks)
- (c) Establish the minimum direct cost of the project if it is desirable that the overall duration should be 24 weeks. Determine the duration of the contract at minimum total cost if the indirect cost amount to £150 per week.
 (11 marks)
- (d) Draw a graph for the client relating the direct cost to contract duration, the latter varying with respect to optimum number of weeks and the actual duration
 (5 marks)

Total 25 marks

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Question 3

The Construction (Design and Management) Regulations 2015 came into effect in April 2015, establish the duties and responsibilities of the various parties to a construction project with regard to the overall management of health and safety in construction.

- (a) What are the key changes made in CDM2015 that are different from previous versions (7 marks)
- (b) Explain and discuss the main roles of:
- i. The principal designer (6 marks)
 - ii. The principal contractor (6 marks)
 - iii. The workers (6 marks)

Total 25 marks

Question 4

- (a) Competitive tendering is still widely used in method of procurement in construction. The basic principle is that the client requires an estimate for the job and the contractor has to ensure the bid enables the contract to profit. With the aid of flowchart briefly explain the procedures inherent for a contractor in preparing a tender (10 marks)
- (b) Briefly explain All in rate payments with reference to labour and plant in construction industry (8 marks)

Question 4 continued over to the next page

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Question 4 continued

- (c) As a part of the substructure work for Dubai Creek city phase 2 projects, it is required to carry out an excavation of depth 8m below ground level. The bottom cross section is 30m x 60m and the top cross section is 46m x 76m 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 1.25m³ bucket and a working output of 150m³ (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 summarised in Table Q4.

Table Q4

Man Power	Hourly Rates
Drag Line Operator	AED 45
Mechanic Fitter	AED 35
Banksman	AED 25
Labourer	AED 25

Determine the direct cost and the cost per m³ of this excavation operation.

(7 marks)

Total 25 marks

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Question 5

The information tabulated in **Table Q5** details the sequence of activities for each of 20 houses to be constructed for a Residential villa project. Optimum crew and total man-hours per activity for each activity are extracted from the contractor's method of statement.

Table Q5

Operation (Activity)	Manhours per activity	Optimum gang size per activity
A- Substructure	110	3
B- Superstructure	320	8
C- Joinery	365	9
D- Plumbing	35	2
E- Finishes	210	5

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 buffer of 5 days 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 **TableQ5-a** provided on **Pages 7 to 9** for activities A to E inclusive.

(12.5 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 Residential Villa Project.

(7.5 marks)

(c) Quality assurance is a declaration given to inspire confidence that a particular organization is capable of consistently satisfying the needs. Basically, it is a management process designed to increase confidence in a product or service by consistently achieving the stated objectives. Highlight a few of the benefits of Quality Assurance required in the above Residential Villa Project.

(5 marks)

Total 25 marks

Question 5 continued over to the next page

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Question 5 continued

Table Q5-a

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		

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Question 5 continued

TableQ5a

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	

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Question 5 continued

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TableQ5a

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

PAST EX

END OF PAPER

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