

UNIVERSITY OF BOLTON
SCHOOL OF ENGINEERING
BENG (HONS) CIVIL ENGINEERING
SEMESTER ONE EXAMINATIONS 2022/2023
CONSTRUCTION MANAGEMENT / CONSTRUCTION
MANAGEMENT AND DIGITAL SKILLS
MODULE NO: CIE5014/CIE5002

Date: Monday 9th January 2023

Time: 10:00 – 12:00

INSTRUCTIONS TO CANDIDATES:

This assessment contains two sections: section 'A' and section 'B'

Section A contains **TWO COMPULSORY** questions: you must answer these two questions. They are worth 50 marks.

Section B contains three questions: you should answer **ANY TWO** questions from these three questions. Each of these questions is worth 25 marks.

A formula sheet has been provided on page 6

Marks for parts of questions are shown in brackets.

This assessment carries 100 marks.

All working must be shown.

School of Engineering
 BEng (Hons) Civil Engineering
 Semester One Examinations 2022/23
 Construction Management / Construction Management & Digital Skills
 Module No. CIE5014/CIE5002

Section A – COMPULSORY Questions

Question One

Table Q1 contains 11 construction activities and their duration (in **days**) in a project. The table also shows the immediate predecessor for each activity (s) as well as the constraints, Finish to Start (**FS**), of some activities (in **days**) from a specific predecessor.

Activity	Duration	Preceded By	FS
A	2	–	
B	5	A	2
C	6	A	
D	6	B	
E	7	B	3
F	4	B, C	
G	5	C	
H	10	D, E	
		F	2
I	8	E, F, G	
J	7	D	
K	1	H, J	
		I	1

Table Q1

Complete the following tasks:

- (a) Draw a network diagram for the above activities using a Precedence Diagram. **(7 marks)**
- (b) Carry out forward and backward passes to determine earliest & latest start times and earliest & latest finish times for each activity, the network critical path and the project duration. **(10 marks)**
- (c) Calculate the Total Float (TF) and Free Float (FF) for all activities. **(8 marks)**

Total 25 marks

Section A continues over the page....

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School of Engineering
BEng (Hons) Civil Engineering
Semester One Examinations 2022/23
Construction Management / Construction Management & Digital Skills
Module No. CIE5014/CIE5002

Section A continued....

Question Two

Health and Safety (H & S) is one of the key objectives of any construction project. There are legal and commercial reasons why H & S should be a priority for all construction organisations. It can affect, and be affected by all the other project objectives.

Within this context answer the following:

- (a) Discuss when should H & S management should start in a construction project and give two examples of that. **(7 marks)**
- (b) Briefly discuss the regulations govern H & S in the UK Construction Industry. **(10 marks)**
- (c) Discuss the ways by which we can control H & S in a construction site. **(8 marks)**

Total 25 marks

END OF SECTION A

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School of Engineering
BEng (Hons) Civil Engineering
Semester One Examinations 2022/23
Construction Management / Construction Management & Digital Skills
Module No. CIE5014/CIE5002

Section B – Answer ANY TWO Questions

Question Three

The losses arising from poor materials management are probably the largest single contributor to the loss of money within any construction company. On many construction projects the materials content (inclusive of the cost of unloading, storing & transporting them around the site), can add up to well over half the contract value.

- (a) Explain any four common causes of materials wastage associated with construction projects. **(8 marks)**
- (b) Describe how the following processes may improve the control of materials wastage and thus reduce the amount of money lost on a project:-
- (i) Accurate requisitioning **(6 marks)**
 - (ii) Quality control **(6 marks)**
 - (iii) Storage of materials **(5 marks)**

Total 25 marks

Question Four

- (a) It is the responsibility of the originator of communication in construction projects to ensure that the message has been received, understood and acted upon. Identify and plain the various points that should be carefully considered in order to achieve this. **(8 marks)**
- (b) Evaluate the methods of communication employed in the construction industry. **(8 marks)**
- (c) Analyse barriers to communication, providing appropriate examples and discuss how they may be overcome. **(9 marks)**

Total 25 marks

Section B continues over the page....

PLEASE TURN THE PAGE....

School of Engineering
BEng (Hons) Civil Engineering
Semester One Examinations 2022/23
Construction Management / Construction Management & Digital Skills
Module No. CIE5014/CIE5002

Section B continued....

Question Five

- (a) Define the term earned value management (**EVM**) and discuss its main components and their implementation to assess performance of a project.
(5 marks)
- (b) A project was planned for a budget of £200,000 and duration of 12 months. At the end of month four, it was found that only 25% of the project was completed for a cost of £75,000. Using the Earned Value method, find the following:
- (i) The project **CV, SV, CPI, SPI** at this stage **(10 marks)**
 - (ii) Explain the status of the project at this stage **(5 marks)**
 - (iii) Forecast the new budget (EAC) to complete the project if the project continued to perform at the same rate **(5 marks)**

Total 25 Marks

END OF SECTION B

END OF QUESTIONS

Formula sheets over the page....

PLEASE TURN THE PAGE....

School of Engineering
 BEng (Hons) Civil Engineering
 Semester One Examinations 2022/23
 Construction Management / Construction Management & Digital Skills
 Module No. CIE5014/CIE5002

Useful Formulae

EVM Terms and Equations

EVM Term		Definition	Formula
Planned Value*	PV	The budgeted cost for the work scheduled. For the whole project this represent the planned budget (BAC)	
Earned Value*	EV	The budgeted cost for the work actually completed.	
Actual Cost*	AC	The actual cost of the work actually completed.	
Schedule Variance	SV	The measure of schedule performance on a project.	$SV = EV - PV$
Cost Variance	CV	The measure of cost performance on a project.	$CV = EV - AC$
Schedule Performance Index	SPI	The measure of progress achieved compared to progress planned.	$SPI = EV / PV$
Cost Performance Index	CPI	The measure of the value of work completed compared to the actual cost or progress.	$CPI = EV / AC$
Estimate at Completion	EAC	This the completion cost at which the project will continue to perform to the end as it was performing until now (i.e. future performance = past performance).	$EAC = (BAC)/CPI$

END OF PAPER