UNIVERSITY OF BOLTON

SCHOOL OF ENGINEERING

BENG (HONS) CIVIL ENGINEERING

SEMESTER ONE EXAMINATIONS 2024/2025

CONSTRUCTION MANAGEMENT & DIGITAL SKILLS

MODULE NO: CIE5014

Date: Wednesday 8th January 2025 **Time: 10:00 – 12:00pm**

INSTRUCTIONS TO CANDIDATES:

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

Section A contains TWO questions: you MUST ANSWER THESE TWO questions. They are worth 70 marks.

Section B contains TWO questions: you should answer ANY ONE of them. Each of these questions is worth 30 marks.

Marks for parts of questions are shown in brackets.

This assessment carries 100 marks.

All working must be shown.

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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.
(10 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 non-critical activities.
(10 marks)

[**Total 30 marks]**

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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.

(10 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.

(10 marks)

(d) Discuss the contents of the two documents required by created in CDM2015 for a construction project and who is responsible of creating each of the documents.

(10 marks)

[Total 40 marks]

END OF SECTION A

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SECTION B – ANSWER ANY ONE OF THESE TWO QUESTIONS

Question Three

(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.

(10 marks)

(b) Evaluate the methods of communication employed in the construction industry.

(10 marks)

(c) Analyse barriers to communication, providing appropriate examples and discuss how they may be overcome.

(10 marks)

[Total 30 marks]

Question Four

(a) Define the term project cost management and discuss its main components and their implementation at different stages of the 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

(15 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 30 Marks]

END OF QUESTIONS

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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