UNIVERSITY OF BOLTON

OFF CAMPUS DIVISION

WESTERN INTERNATIONAL COLLEGE

BENG (HONS) CIVIL ENGINEERING

SEMESTER ONE EXAMINATION 2024/2025

CONSTRUCTION MANAGEMENT AND DIGITAL SKILLS

MODULE NO: CIE5014

Date: Tuesday, 7 January 2025 **Time: 10:00 am – 12:00 pm**

INSTRUCTIONS TO CANDIDATES:

There are FOUR (4) questions in this paper.

All questions carry equal marks.

Answer ANY THREE (3) questions.

Marks for parts of questions are shown in brackets.

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

This examination paper carries a total of 75 marks.

Pages 6 and 7 should be attached with the answer script.

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QUESTION 1

Losses due to poor materials management are likely the single greatest contributor to financial losses in any construction company. In many construction projects, the cost of materials—including unloading, storage, and on-site transport—can account for well over half of the total contract value.

i) Explain some common causes of material wastage associated with construction projects.

(7 marks)

ii) Describe how the following processes may improve the control of materials and thus reduce the financial losses on a project:

- Accurate requisitioning **(9 marks)**

- Quality Control **(9 marks)**

[TOTAL 25 MARKS]

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QUESTION 2

A facility management team has been assigned to repaint the interior of a small office room. The client requires the work to be completed efficiently and at the lowest possible cost. The project plan includes a series of activities, and **Table Q2** provides details of each activity's duration and direct costs under both normal and crashed conditions. Assume the indirect cost per day as 60.00 AED.

i) Draw network diagram and find normal completion time and total normal cost of the project

(4 marks)

ii) Crash the project systematically and evaluate optimal completion time and optimal cost of the project

(17 marks)

Table Q2

Activity	**Normal**		**Crash**	
	Duration (Days)	**Cost (AED)**	**Duration (Days)**	**Cost (AED)**
1-2	9	640	6	700
1-3	8	500	5	575
1-4	15	400	10	550
2-4	5	100	3	120
3-4	10	200	6	260
4-5	2	100	1	180

iii) What is the Critical Path Method (CPM) in project management, and how does it assist in managing project schedules effectively?

(4 marks)

[TOTAL 25 MARKS]
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QUESTION 3

In any project, it is the responsibility of the originator of communication to ensure that the message has been received, understood and acted upon.

i) Evaluate the methods of communication employed in the construction industry.

(10 marks)

ii) For a university construction project in Ajman, there is a need to excavate a site 8 meters below ground level. The bottom cross-section of the excavation is 25 X 50 meters, and the sides are sloped at an angle of 40° to the horizontal. The site's soil composition consists mainly of clay and silt. To perform the excavation, a dragline with a 1.5 m³ bucket is selected. This dragline has a working output of 160 m³ (loose) per hour when operating in clay and silt. The equipment can be rented at an hourly rate of AED 250. Determine the total cost of the excavation and the cost per m^3 for this project. The manpower requirement for this excavation operation, with hourly rates, is summarized in **Table Q3**.

(15 marks)

Table Q3

Man Power	**Hourly Rates**
Dragline Operator	AED 45.00
Mechanic Fitter	AED 35.00
Banksman	AED 32.00
Labourer	AED 30.00

[TOTAL 25 MARKS]

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QUESTION 4

Table Q4 provides the sequence of activities required to refurbish 20 office spaces in a corporate building. The optimum team sizes and total man-hours per activity for each office space are listed based on the contractor's method statement.

Table Q4

Activity	**Man-hours per activity (per unit)**	**Optimum gang size per activity (per unit)**
A - Wall Preparation	180	2
B - Painting	320	3
C - Flooring	420	4
D - Electrical Fitting	250	2

The contractor works Monday through Friday, eight hours per day, with a target rate of refurbishing 4 office spaces per week. A 2-day buffer time is considered necessary for this project, and all tasks are assumed to be carried out in a sequential order.

i) Complete the line of balance **CALCULATION SHEET** provided on **Pages 6 and 7** for activities A to D inclusive.

(15 marks)

ii) Develop a fully annotated Line of Balance Schedule on the graph paper provided (landscape orientation), and state the minimum duration for completion of the refurbishment.

(10 marks)

[TOTAL 25 MARKS]

END OF QUESTIONS

PLEASE TURN THE PAGE FOR CALCULATION SHEET

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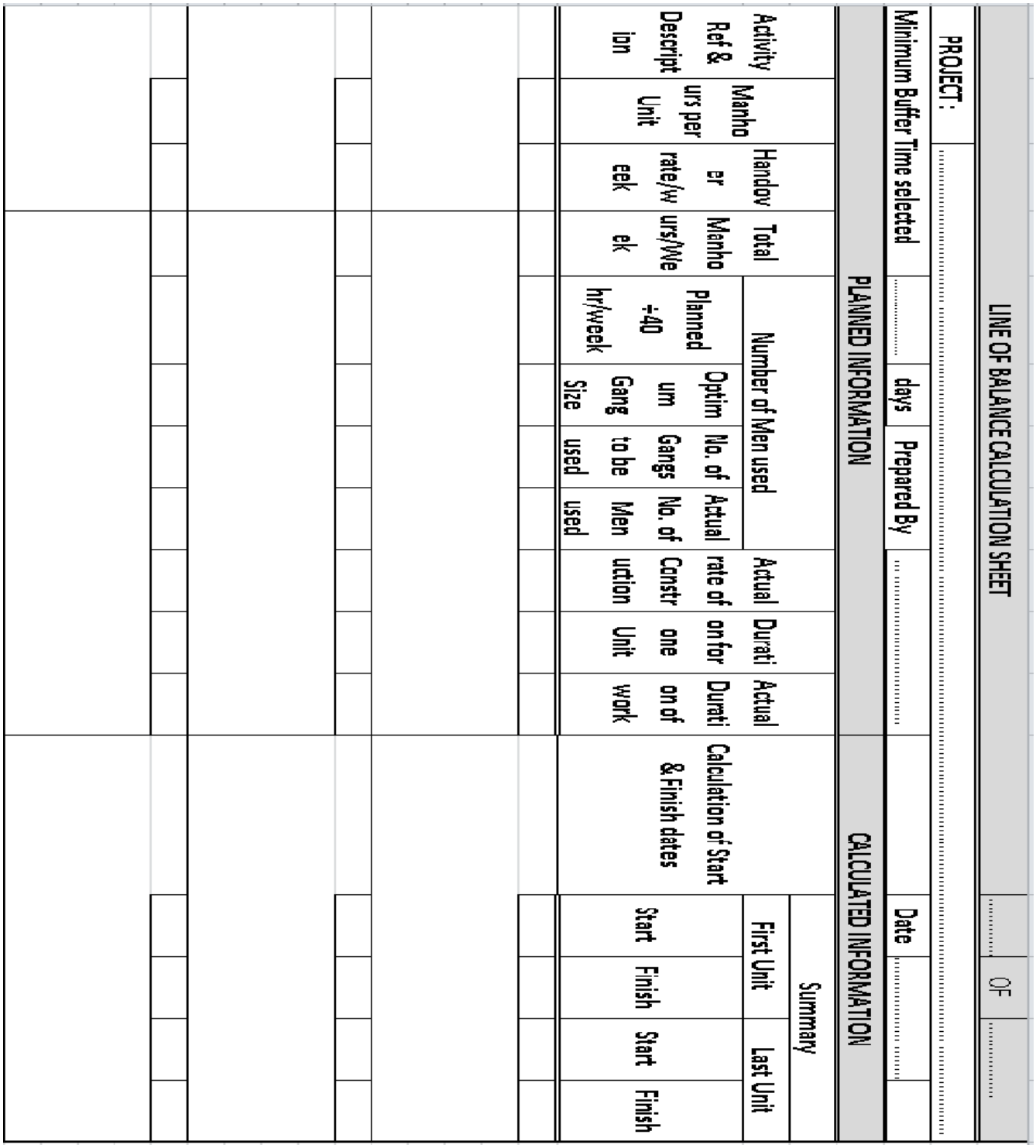
CALCULATION SHEET



Calculation sheet continued over the page…

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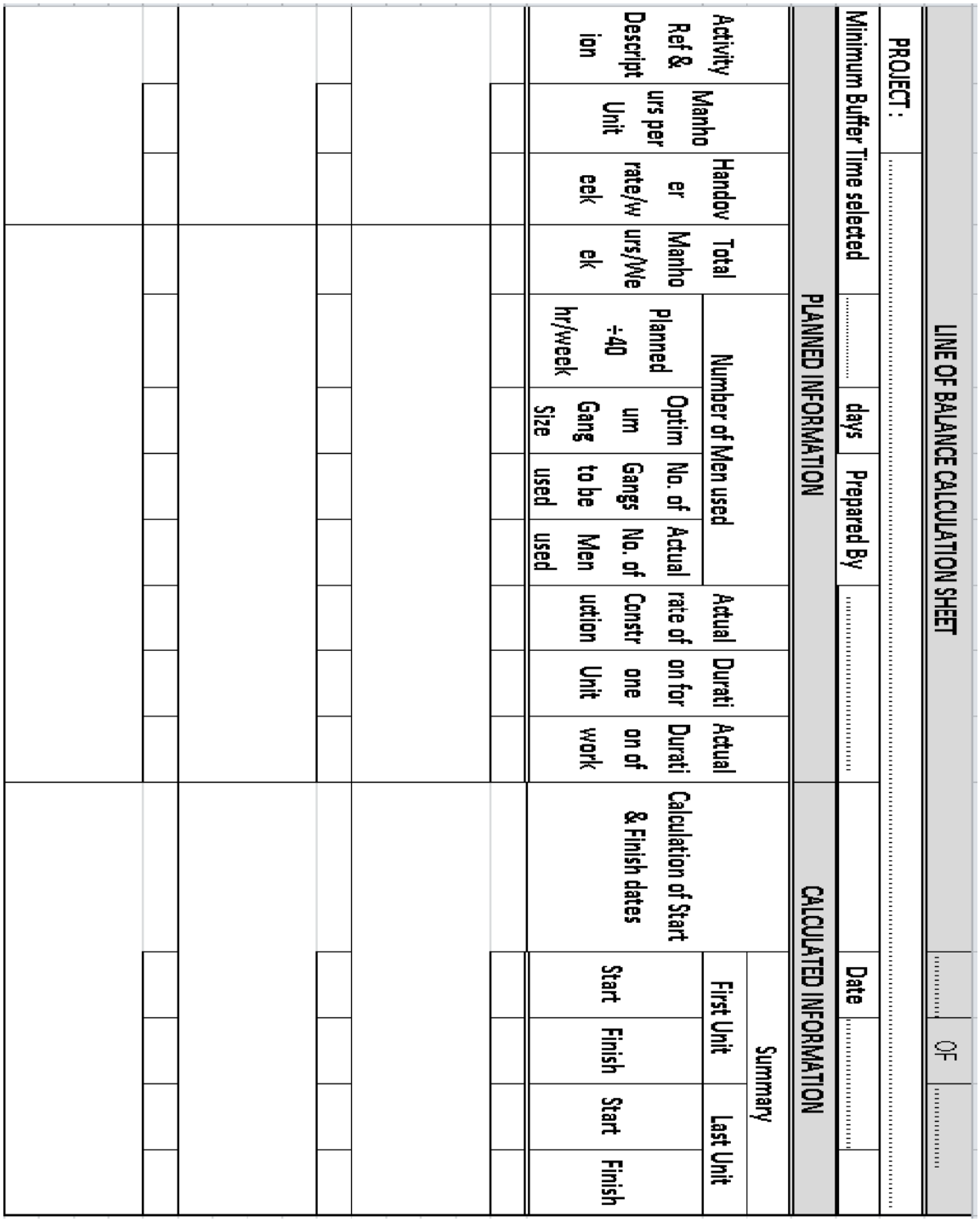
Calculation sheet continued…



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