NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF CONSTRUCTION MANAGEMENT

SITE MANAGEMENT

BCM3002

Examination Paper

February 2025

This examination paper consists of Four (4) pages.

Time Allowed: **3 hours**

Total Marks: **100**

Special Requirements: **None**

Examiner's Name: **Mr. J Matande/ Mr E Kanyamaure/ Dr. D Mwembe**

INSTRUCTIONS

1. Answer Question **One (1)** from Section A
2. Answer any **Two (2)** question from Section B
3. Answer any **Two (2)** questions from Section C
4. *Use of non-programmed calculators is permissible.*

MARK ALLOCATION

SECTION A	
Question	**MARKS**
1.	20
SECTION B	
2.	15
3.	15
4.	15
SECTION C	
4	25
5	25
6	25
TOTAL	**100**

Section A

Question One

a. Obtain initial feasible solution for the following Transportation problem in Table 1 using:

(i) North West Corner rule, [5 marks]

(ii) Least Cost Method, and [5marks]

(iii) Vogel's Approximation Method (VAM). [10marks]

Table 1: Transportation costs and associated demand and supply

	Destination			
Source	A	B	C	Supply
1	2	7	4	5
2	3	3	1	8
3	5	4	7	7
4	1	6	2	14
Demand	7	9	18	-

[20marks]

SECTION B (Answer any two (2) questions)

Question Two

a. A contractor hiring earth moving equipment has the choice of two machines.
Type A costs $25 per day to hire, and needs one man to operate it and moves 30 tonnes of earth per day.
Type B costs $10 per day to hire, and needs four men to operate it and moves 70 tonnes of earth per day.
The contractor can spend up to $500 per day, has a labour force of 64 men available and can use a maximum of 25 machines on the site.
Find the maximum weight of earth that the contractor can move in one day. [15 marks]

[15marks]

Question Three

(a) Outline the steps involved in the Hungarian method. [5 marks]

(b) Job shop needs to assign four jobs to four workers. The cost of performing a job is a function of the skills of the workers. Table 2 summarises the cost of the assignments. Worker one cannot do job three and worker three cannot do job four. Determine the optimal assignment to minimize total cost. [10marks]

Table 2: The assignment costs

Job					
Worker		1	2	3	4
	1	50	50	-	20
	2	70	40	20	30
	3	90	30	50	-
	4	70	20	60	70

[15marks]

Question Four

Consider the following project in Table 3:
Table 3: Project details

Activity	Immediate Predecessor	Normal Time (Months)	Crash Time (Months)	Normal cost ($)	Crash cost ($)
A	-	5	2	100	150
B	A	7	3	50	150
C	A	8	4	300	600
D	A	3	-	200	-
E	B	4	1	150	300
F	B	6	2	50	150
G	C	7	2	300	400
H	D	3	-	200	-
I	E	6	1	300	350
J	F, G, H	7	2	130	280

(a) Find the EST, EFT, LST, LFT. [5marks]

(b) Find project completion time by finding the critical path. [5marks]

(c) If the project is to be reduced by 2 days, what will be the total cost? [5marks]

[15marks]

SECTION C (Answer any two (2) questions)

Question One.

a. Explain the importance of having an organizational structure on a construction project. [3marks]
b. Briefly explain how you would ensure quality of aggregates on a construction site. [5marks]
c. Explain any **four (4)** qualities of a site manager. [8marks]
d. With the aid of sketches discuss **three (3)** types of organizational structures that can be used on construction sites. [9marks]

e. **[25marks]**

Question Two

a. Explain how safety audits are conducted by a construction manager. [10marks]
b. Safety is a top priority on a construction site. Discuss how a contractor can manage a construction site so as to have an accident free site. [15marks]

c. **[25marks]**

Question Three

a. Project time management involves various processes in order to complete the project on time. Describe any **five (5)** necessary steps involved in project time management. [10 marks]
b. Discuss **five (5)** reasons of using a construction plant [5marks]
c. Explain the following maintenance strategies applied to construction machinery and equipment.

I. Preventative [5marks]
II. Corrective [5marks]

[25marks]

END OF EXAMINATION