



**GWANDA STATE UNIVERSITY**  
**FACULTY OF ENGINEERING AND ENVIRONMENT**  
**DEPARTMENT OF METALLURGICAL ENGINEERING**  
**MANAGEMENT FOR PROCESS ENGINEERS**

**EMR 5202**

**Part V Second Semester Examination Paper**

**JUNE 2023**

This examination paper consists of 4 printed pages

**Time Allowed: 3 hours**

**Total Marks: 100**

**Dr Nkomo Fortune**

**INSTRUCTIONS**

1. Answer **ALL** questions in **Section A** and any **TWO** from **Section B**
2. Each question carries 25 marks
3. Use of calculators is permissible

**Additional Requirements**

**MARK ALLOCATION**

Section A	50 Marks
Section B	50 Marks
Part Questions	As shown in each part question
Total Attainable	100

## SECTION A (50 MARKS)

### ANSWER ALL QUESTIONS

#### USE THE INFORMATION BELOW TO ANSWER QUESTIONS A1 AND A2

##### Question A1

Hwange Colliery Company produces two types of products thermal coal and metallurgical coke. The profits per tonne of the two products are \$30 and \$40 respectively. These two products require processing in three types of plants. Table A1 shows the available plant hours per day and the time required on each plant to produce one tonne of thermal coal and metallurgical coke. Formulate the problem in the form of linear programming model and determine the product distribution that the company must target to produce in order to maximize total profit contribution. [25 Marks]?

**Table A1**

Product	Thermal Coal	Metallurgical Coke	Total Available Plant Hours Per day
Profit Per Tonne	\$30	\$40	
Plant 1	3	2	600
Plant 2	3	5	800
Plant 3	5	6	1100

##### Question A2

- Determine the idle capacity in each production plant [5 Marks]
- Due to the increased power demand Hwange Colliery management is concerned about the fluctuations in prices of raw materials, product demand and stock prices. Determine the profit contribution range per tonne that the marketing department must negotiate within in order to maintain the product distribution determined in Question 1A [20 Marks]?

## SECTION B (50 MARKS)

### ANSWER ANY TWO QUESTIONS

##### Question B1

Some businesspeople think that inventory as a necessary evil while others think inventory as an asset. What is your view? [25 Marks]

##### Question B2

Explain the terms: event, predecessor event, successor event, activity, dummy Activity as used in project management [10 Marks]

A project consists of seven activities with the following time estimates. Find the probability that the project will be completed in 30 weeks or less. [15 Marks]

Activity	Predecessor Activity	Optimistic Time Estimate ( $t_o$ Days)	Most likely Time Estimate ( $t_m$ Days)	Pessimistic Time Estimate ( $t_p$ Days)
A	-	2	5	8
B	A	2	3	4
C	A	6	8	10
D	A	2	4	6
E	B	2	6	10
F	C	6	7	8
G	D, E, F	6	8	10

### Question B3

Explain terms budget and budgetary control as applied to management. [15 Marks]

What are the major functions of inventory in an organization? [10 Marks]

**END OF QUESTION PAPER**