



PAN AFRICA CHRISTIAN UNIVERSITY

**END OF SEMESTER EXAMINATION FOR THE DEGREE OF
JANUARY –APRIL 2026**

CAMPUS: ROYSAMBU

DEPARTMENT: BUSINESS

COURSE CODE: BCM 303

COURSE TITLE: MANAGEMENT DECISION MODELS

EXAM DATE:

TIME:

INSTRUCTIONS

- This examination script consists of **FIVE (5)** questions.
- Answer question **ONE** and ANY other **THREE** Questions.
- Read all questions carefully before attempting.
- Write your **student number** on the answer booklet provided.

Question One (compulsory)

(30 marks)

a. A Company manufactures; maize flour, wheat flour and animal feeds. The company has 50 employees including the management and the support staff. The company has faced challenges that include rejection of its products on market, transportation challenges and huge losses. You have been invited by the management as an expert to give advice to improve the situation. Given

that management involves decision-making, briefly discuss how you could assist the management under the following concepts:

- i. Definition of the term "decision" as used in management models. (3marks)
- ii. Definition of "linear programming" as used in management models (3 marks)
- iii. Assumptions made in solving transportation problems (4 marks)
- iv. Explain five assumptions of a linear programming model (5mks)

b. **Express Move Ltd** is a transport company that operates a fleet of 50 delivery trucks. Over the last month, the company has faced several challenges:

- Three trucks broke down in the middle of long-distance deliveries.
- Fuel costs have risen by 15%, eating into all the company's profits.
- Drivers are complaining that their routes are inefficient, causing them to work 14-hour days.
- A major client threatened to cancel their contract because their packages arrived damaged.

The Board has just hired you as the **Operations Manager** to stabilize the company.

Required

As the new Operations Manager for Express Move Ltd, discuss five key roles and responsibilities you must undertake to resolve the issues mentioned in the scenario and ensure the company's survival (10 marks)

c. From the following table:

- i. Draw a network diagram and find its critical path. (5marks)

Activity	1-2	1-3	1-4	2-6	3-7	3-5	4-5	5-9	6-8	7-8	8-9
Duration (in days)	2	2	1	4	5	8	3	5	1	4	3

SECTION B: ANSWER ANY THREE QUESTIONS

Question Two**(10 marks)**

A Firm manufacture two types of products designated by A and B. Product A consumes 2Kg of raw material and 4 hours of labor per unit. Product B consumes 3Kg of raw material and 3 hours of labor per unit. 60Kg of raw material and 96 hours of labor are available per week. The profit on one unit of product A is Ksh.40. The profit on one unit of product B is Ksh.35

Required

- i. Formulate a linear programming model to maximize profit for the firm given that all the products are sold. (10 marks)

Question Three**(10 marks)**

- a. It is the 15th of the month at the National Apex Bank's main city branch. This is the busiest day because government salaries are processed. Currently:
 - i. The physical line for the tellers stretches out the front door into the street.
 - ii. High-net-worth (Premium) clients are complaining that they have to wait behind students opening their first accounts.
 - iii. Three tellers have called in sick, and the remaining staff are overwhelmed, leading to frequent errors in cash counting.

The Branch Manager has tasked you with redesigning the Queuing System to save the bank's reputation.

Required

As the Operations Specialist for National Apex Bank, discuss three specific goals you aim to achieve by redesigning the branch's queuing system, applying them to the "Mid-Month Rush" scenario. (6 marks)

- b. Using simulation approach, analysts introduce constants and variables related to a problem, then set up possible course of actions and establish criteria which serves as a measure of effectiveness. Explain any **four** steps followed in constructing a simulation model. (4 marks)

Question Four**(10 marks)**

- a. Explain any **three** relevant rules used in construction of a network as applied in decision models. (6 marks)
- b. Compare and contrast the project evaluation and review technique (PERT) with the critical path method (CPM). (4 marks)

Question Five

(10 marks)

Four factories A, B, C and D produce sugar. Factory A produces 10 tons of sugar, factory B produces 8 tons of sugar, C produces 5 tons and D produces 6 tons of sugar. The sugar has demands in three markets X, Y, and Z . The demand for market X is 7 tons, Y is 12 tons and Z is 4 tons. The following matrix gives the transportation cost of 1 ton of sugar from each factory to the destination.

Factories	Cost in shs. per ton(*100)			Availability in ton
	Markets			
	X	Y	Z	
A	4	3	2	10
B	5	6	1	8
C	6	4	3	5
D	3	5	4	6
REQUIREMENTS IN TONNES	7	12	4	

Required

- i. Find the optimal solution using the vogel's approximation method. (10 marks)