



PAN AFRICA CHRISTIAN UNIVERSITY

END OF SEMESTER EXAMINATION FOR THE DEGREE OF

JANUARY –APRIL 2021

CAMPUS: ROYSAMBU

DEPARTMENT: BUSINESS

COURSE CODE: BCM 303

COURSE TITLE: MANAGEMENT DECISION MODELS

EXAM DATE:

TIME:

INSTRUCTIONS

- This examination script consists of **SIX (6)** 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) : ANSWER ALL QUESTIONS (10 marks)

- i. The purpose of the transportation approach for locational analysis is to minimize
 - a) Total costs
 - b) Total shipping costs
 - c) Total variable costs
 - d) Total fixed costs
 - e) The number of shipments

- ii. The initial solution to a transportation problem can be generated in any manner, so long as
 - a) it minimizes cost
 - b) it ignores cost
 - c) all supply and demand are satisfied
 - d) degeneracy does not exist
 - e) all cells are filled

- iii. Which of the following statements about the northwest corner rule is false?
 - a) One must exhaust the supply for each row before moving down to the next row.
 - b) One must exhaust the demand requirements of each column before moving to the next column.
 - c) When moving to a new row or column, one must select the cell with the lowest cost.
 - d) One must check that all supply and demand constraints are met.
 - e) All of the above are false.

- iv. In transportation model analysis the stepping-stone method is used to
 - a) obtain an initial optimum solution
 - b) obtain an initial feasible solution
 - c) evaluate empty cells for potential solution improvements
 - d) evaluate empty cells for possible degeneracy
 - e) balance supply and demand

- v. A transportation problem has a feasible solution when
 - a) all of the improvement indexes are positive

- b) the number of filled cells is one less than the number of rows plus the number of columns
 - c) all the squares are used
 - d) the solution yields the lowest possible cost
 - e) all demand and supply constraints are satisfied

- vi. When the number of shipments in a feasible solution is less than the number of rows plus the number of columns minus one
 - a) the solution is optimal
 - b) there is degeneracy, and an artificial allocation must be created
 - c) a dummy source must be created
 - d) a dummy destination must be created
 - e) the closed path has a triangular shape

- vii. The total cost of the optimal solution to a transportation problem
 - a) is calculated by multiplying the total supply (including any dummy values) by the average cost of the cells
 - b) cannot be calculated from the information given
 - c) can be calculated from the original non-optimal cost, by adding the savings made at each improvement
 - d) is found by multiplying the amounts in each cell by the cost for that cell for each row and then subtract the products of the amounts in each cell times the cost of each cell for the columns
 - e) can be calculated based only on the entries in the filled cells of the solution
- viii. The maximization problem is transformed into the minimization problem by:
 - a) adding each entry in a column from the maximum value in that column
 - b) subtracting each entry in a column from the maximum value in that column
 - c) subtracting each entry in the table from the maximum value in that table
 - d) adding each entry in the table from the maximum value in that table

- ix. The minimum number of lines covering all zeros in a reduced cost matrix of order n can be:
 - a) at the most n
 - b) at the least n

- c) $n-1$
- d) $n+1$

x. Any solution to a linear programming problem which also satisfies the non-negative constraints of the problem has:

- a) solution
- b) basic solution
- c) basic feasible solution
- d) feasible solution

ANSWER ANY THREE QUESTIONS

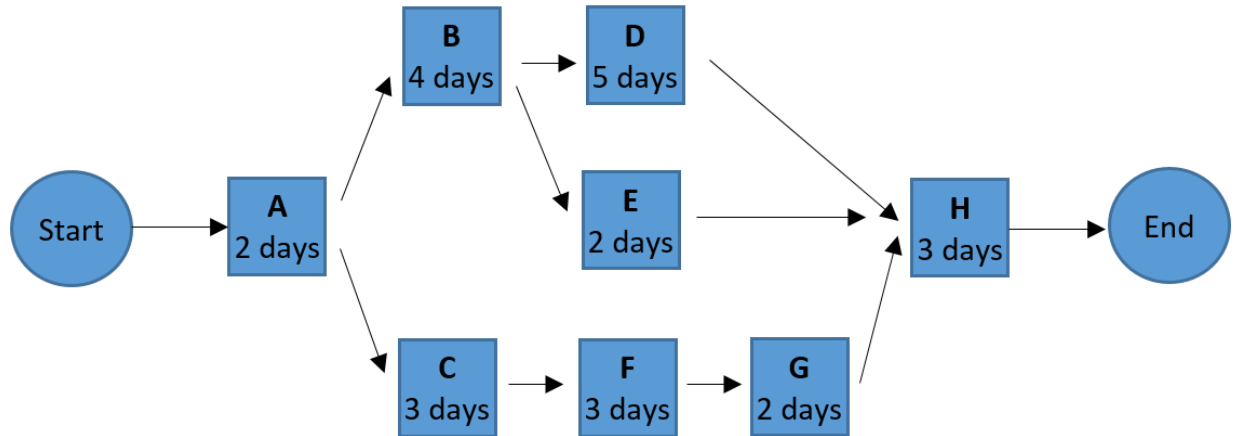
Question Two **(10 marks)**

Solve the following assignment problem. Cell values represent cost of assigning job A, B, C and D to the machines I, II, III and IV.

		machines			
		I	II	III	IV
jobs	A	10	12	19	11
	B	5	10	7	8
	C	12	14	13	11
	D	8	15	11	9

Question Three **(10 marks)**

- a. Compare and contrast the project evaluation and review technique (PERT) with the critical path method (CPM). (8 marks)
- b. Calculate the critical path for the diagram below (2 marks)



Question Four (10 marks)

- Explain the role and responsibilities of an operations manager within an organization. (4 marks)
- Compare and contrast the activities within operations management across THREE different sectors. (6 marks)

Question Five (10 marks)

- Explain the term simulation. (2 marks)
- Discuss **four** application areas of simulation giving relevant examples. (8 marks)

Question Six (10 marks)

- Using relevant examples, discuss **three** importance of game theory. (6 marks)
- Discuss the following as relates to mathematics of the queuing theory
 - Kendall's notation (2 marks)
 - Little law (2 marks)