

**PAN AFRICA CHRISTIAN UNIVERSITY
EXAMINATIONS PAPER**



**PAN AFRICA CHRISTIAN UNIVERSITY
BACHELORS OF INFORMATION COMMUNICATION TECHNOLOGY
END OF TERM EXAMINATION**

DEPARTMENT: COMPUTING & INFORMATION TECHNOLOGY
COURSE CODE: DICT0124
COURSE TITLE: OPERATION RESEARCH
CAMPUS: ROYSAMBU
EXAM DATE: FRIDAY
TIME: START HOUR – 2.00-4.00PM

INSTRUCTIONS

- This exam carry a total of SIX Questions of [10 Marks Each]
- Section One (I) is compulsory.
- Answer any 3(Three) Questions from Section Two (II)
- Read all questions carefully before attempting.

SECTION A
(Answer ALL questions in this section)

Question 1 (10 Marks)

- a) Explain the following in the context of project management:
 - (i) Activity Variance (1 Mark)
 - (ii) Project Variance (1 Mark)
- b) Explain the importance of Operation research. (2 Marks)
- c) Discuss two characteristics of a queuing system. (2 Marks)
- d) Distinguish between feasible and optimal solution as used in linear programming. (2 Marks)
- e) Compare assignment problem with transportation problem. (2 Marks)

SECTION B
((Answer any THREE (3) questions in this section))

Question Two (10 Marks)

- a) Explain the scope of Operation Research. (2 Marks)
- b) Distinguish between PERT and CPM. (2 Marks)
- c) A certain project is composed of mini activities whose time estimates are given below:

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6	6-7	5-7
Duration	1	3	2	1	3	2	4	6	3

Draw the project network and find out the critical path. (6 Marks)

Question Three (10 marks)

- a) Explain the concept of decision-making under uncertainty and its application. (3 Marks)
- b) A company has four factories A,B,C and D which supply warehouses E,F,G and H respectively. Monthly production capacities of these factories are 200, 275, 300 and 175 units respectively. The current warehouse requirements are 200, 275, 300 and 400

units respectively. Unit transportation costs from factories to warehouses are given below.

Factories	Warehouse			
	E	F	G	H
A	10	13	17	10
B	16	18	12	16
C	21	25	13	21
D	15	12	14	15

- i) Using least cost method first to find the initial feasible solution, find the optimal solution (7 Marks)

Question Four (10 marks)

- a) A bank plans to open a single-server drive- in banking facility at a particular centre. It is estimated that 28 customers will arrive each hour on average. On average, 2 minutes are required to process a customer's transaction. Assuming Poisson arrivals and exponential service, determine,
- i) The probability that a customer arriving at the facility will have to wait. (2 Marks)
 - ii) The proportion of time the server will be idle, (2 Marks)
 - iii) On average, how long a customer will have to wait for service, (3 Marks)
 - iv) The average time a customer spends in the system. (3 Marks)

Question Five (10 Marks)

- i) Using an appropriate example, explain degeneracy in transportation problem. (3 Marks)

- ii) Describe three types of solutions generated from Integer programming methods. (3 Marks)
- iii) Explain any two advantages and two limitations of Simulation. (4 Marks)

Question Six (10 Marks)

- a) Explain the circumstances where CPM is a better technique of project management than PERT. (2 Marks)
- b) Discuss how PERT technique help a business manager in decision-making. (3 Marks)
- c) Discuss any two rules for construction of Network in Operation Research. (4 Marks)

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