



Avinashilingam Institute for Home Science and Higher Education for Women
Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD [now MoE]
Re-accredited with an 'A++' Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Continuous Internal Assessment I – February 2025
II Semester

Class: I MBA/I MBA (SF)/I MBA (IT&SM)
Major: Business Administration

Time: 2 hours
Max.marks:60

23MBAC14 / 24MBMC14 Applied Operations Research

Course Outcomes:

1. Identify and develop operational research models from the verbal description of the real system. Further students would understand and apply the mathematical tools that are needed to solve optimization problems.
2. Demonstrate insight with respect to solution techniques namely transportation and assignment for resource and facility allocation.
3. Develop mathematical skills to analyze and solve network models arising from a wide range of applications.
4. Model a dynamic system as a queuing model and compute important performance measures.
5. Simulate the business scenario using random numbers and dynamic programming for model building.

Part A 6 x1=6

Choose the correct answer

1. The graphical method is best suited for solving linear programming problems with _____ no of variables. **CO1K2**
(a) 5 (b) 3 (c) 4 (d) 2
2. In the method of solving by enumeration, the m constraints must be changed into equations by **CO1K2**
(a) Adding slack variables (b) Subtracting slack variables
(c) Multiplying slack variables (d) Dividing slack variables
3. In a balanced transportation problem, the total supply..... **CO2K1**
(a) Is greater than total demand (b) Is less than total demand
(c) Equals total demand (d) Not equals total demand
4. If there are mmm sources and nnn destinations in a transportation problem, the number of basic feasible solutions must be... **CO2K2**
a) $m + n$
b) $m - n$
c) $m + n - 1$
d) $m - n + 1$
5. In a PERT network, the critical path is..... **CO3K2**
(a) The path with the maximum number of activities (b) The path with the least total time
(c) The longest path through the network (d) The path with the most slack
6. An activity in a network diagram is said to be _____ if the delay in its start will further delay the project completion time. **CO3K2**
(a) forward pass (b) backward pass (c) critical (d) non-critical.

Part – B

3x6=18

Answer all the questions

Each answer should not exceed 400 words or three pages

7.a. Brief the applications of Operations Research in Management.

CO2K3

(Or)

7.b. What are the assumptions of Linear Programming?

8.a. Find out the transportation cost using the North-West Corner rule.

CO2K5

	D1	D2	D3	D4	Supply
O1	19	30	50	10	7
O2	70	30	40	60	9
O3	40	8	70	20	18
Demand	5	8	7	14	34

(Or)

8.b. Solve the transportation model using LCM.

CO2K5

	D1	D2	D3	D4	Supply
O1	2	3	11	7	6
O2	1	0	6	1	1
O3	5	8	15	9	10
Demand	7	5	3	2	

9.a. Draw a Network Diagram for the project specified below:

CO3K5

Project	Predecessor Activity
A	-
B	A
C	B
D	B
E	B
F	C
G	C
H	F,G
I	D,E,H
J	I

(Or)

9.b. Compare the PERT and CPM network techniques.

CO3K3

Part – C

3x 12 = 36

Answer all the questions

Each answer should not exceed 600 words or three pages

10.a.i) In a given factory, there are three machines M1, M2 and M3 used in

making two products P1 and P2, respectively. One unit of P1 occupies machine M1 for 5 minutes, machine M2 for 3 minutes and machine M3 for 4 minutes, respectively. The corresponding figures for one unit of P2 are 1 minute for machine M1, 4 minutes for machine M2 and 3 minutes for machine M3, respectively. The net profit for 1 unit of P1 is Rs. 30 and for 1 unit of P2 is Rs. 20 (independent of whether the machines are used to full capacity or not). What production plan gives the most profit? Formulate linear programming model for the problem.

ii) Give a note on i) unbound solution ii) infeasible solution

CO1K3

(Or)

10.b.A company manufactures and sells two types of products and the cost of production of each unit a and b is rupees 200 and 150 respectively each unit of product yields a profit of 20 rupees and each unit of product b yields a profit of 15 rupees on selling. The company estimates the monthly demand of A and B to be at a maximum of the harvested unit in all the month. How many units should the company manufacture to earn maximum profit from its monthly sales from a and b? Use Graphical method.

11.a.Solve using VAM.

CO2K5

	D1	D2	D3	D4	Supply
O1	4	6	8	13	50
O2	13	11	10	8	70
O3	14	4	10	13	30
O4	9	11	13	8	50
Demand	25	35	105	20	

(Or)

11.b.A department of a company has five employees and five jobs to be performed. Using Hungarian method, allocate one job to each employee.

CO2K5

	I	II	III	IV	V
A	10	5	13	15	16
B	3	9	18	13	6
C	10	7	2	2	2
D	7	11	9	7	12
E	7	9	10	4	12

Compulsory Question

12. Use the simplex method to solve the following LP problem.

$$Z = 3x_1 + 5x_2 + 4x_3$$

subject to constraints

- i) $2x_1 + 3x_2 \leq 8$
 - ii) $2x_2 + 5x_3 \leq 10$
 - iii) $3x_1 + 2x_2 + 4x_3 \leq 15$
- $x_1, x_2, x_3 \geq 0$

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