(FOR THE CANDIDATES ADMITTED
DURING THE ACADEMIC YEAR 2024ONLY)   REG.NO. :

22UPA6E1

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI
END-OF-SEMESTER EXAMINATIONS : APRIL 2025
B.COM PA   **MAXIMUM MARKS: 50**
SEMESTER:VI   **TIME : 3 HOURS**

PART - III
22UPA6E1 - OPERATIONAL RESEARCH
SECTION – A   10X1=10 MARKS

ANSWER THE FOLLOWING MULTIPLE CHOICE QUESTIONS
1. Graphic method of LPP is limited to
a) Two variable b) Three variables   c) One variable d) Four variable
2. Which objective is to transport various quantities of a single
a) Available b) Homogeneous commodity   c) Programmed d) Making
3. Several problems of management has a structure identical with the
a) Vogal approx mat b) Northwest corner rule   c) Assignment Problems
d) Transportation Problems
4. The overcome such limitations PERT and CPM were proposed in the late
a) 1951   b) 1947   c) 1948   d) 1950
5. Game theory is a type of decision theory which is based on the choice of
a) Theory b) Game   c) Action d) Decision
ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES QUESTIONS
6. Simplex method means.
7. Meanings of transportation model.
8. Meanings of Assignment
9. What is PERT?
10. Write a short notes on Game theory?

SECION – B   (5X3=15 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.   (K3)
11.(a) Briefly explain the history of Simplex Model.   (OR)
11. (b) List out the Limitations of LPP Method.
12. a) Find out the steps involved in NAM Methods.   (OR)
12.(b) Consider the following transportation problem and solve by applying NWCM

	W1	W2	W3	
P1	7	6	9	20
P2	5	7	3	28

ETHICAL PAPER

P3	4	5	8	17
	21	25	19	65

13.a) Describe the formulation of an assignment problem.   (OR)

13.b) Briefly explain the Hungarian method.

14.(a) Given the following table develop a network.

Beginning Event	1	1	2	3	3	4	5
Ending Event	2	3	4	4	5	6	6
Activity	1-2	1-3	2-4	3-4	3-5	4-6	5-6

Construct a network diagram

(OR)

14.(b) Construct a network for the project whose activities and their precedence relationship are a given below

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

15.a). Solve the game whose pay off matrix is

	I	II	III
I	-3	-2	6
II	3	0	2
III	5	-2	-4

(OR)

15.b) Solve the following Game Equal or Not

B

Equal :

A $\begin{pmatrix} 5 & 1 \\ 3 & 4 \end{pmatrix}$

SECTION– C   (5X5= 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K4 /K5)

16.a) **Linear Programme Graphical method.**

   Miz= $20x_{1} + 10x_{2}$

   subject to $x_{1} + 2x_{2} \leq 40$
                         $3x_{1} + x_{2} \geq 30$
                         $4x_{1} + 3x_{2} \geq 60$
                              $x_{1} + x_{2} = \geq 0$ (OR)

16.b)   A manufacturer of leather belts makes three types of belts A,B and C which are processed on three machines M1,M2,and M3. Belt A requires 2hours on machine M1 and 3hours on machine M3. Belt B requires 3 hours on machine M1, 2hours on machine M2 and 2 hours on machine M3 and belt

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C requires 5 hours or machine M2 and 4hours on machine M3. There are 8 hours of time per day available on machine M1, 10 hours of time per day available on machine M2 and 15 hours of time per day available on machine M3. The profit gained from belt A is Rs.3.00 per unit, from belt B is Rs.5.00 per unit, from belt C is Rs.4.00 per unit. What should be the daily production of each type of belts so that the profit is maximum.

17 a) Solving Transportation Problem using North West Corner Rules

	A	B	C	D	Availability
W1. W2. W3.	11	13	17	14	250
	16	18	14	10	300
	21	24	13	10	400
Equipment	200	225	275	250	950

(OR)

17.b) Corporation has three manufacturing shipping to three warehouses. The production of plants (in thousands of units) requirement of the warehouses (in thousands of units), and shipping cost (in Rs.) per unit from each source to each warehouse is given below:

Plants	W1	W2	W3	Production
P1	1.80	1.40	1.60	140
P2	2.00	1.80	2.60	130
P3	1.40	1.20	3.20	110
Total	180	140	70	

Determine the initial basis feasible using the Vogel's approximation Method.   (OR)

18.a) Consider the following problem of assigning five jobs to five persons. The assignment costs are given as follows:

		JOB				
		1	2	3	4	5
	A	8	4	2	6	1
	B	0	9	5	5	4
Person	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

Determine the optimum Assignment schedule and Minimum cost.

18.b) A book binder has one printing press one binding machine and manuscript of 7 different books. The time required for performing printing and binding operations for different books are shown below.

Book	Printing Time (Days)	Binding time (Days)
1	20	25
2	90	60
3	80	75

4	20	30
5	120	90
6	15	35
7	65	50

Decide the optimum sequence processing of books in order to minimize the total time.

19.a) The characteristics of a project schedule are as given below:

Activity	Time(days)	Activity	Time (days)
1-2	4	5-6	4
1-3	1	5-7	8
2-4	1	6-8	1
3-4	1	7-8	2
3-5	6	8-10	5
4-9	5	9-10	7

From the above Table(a) Construct a PERT network, (b) Compute earliest and latest expected time for each event. (c) Find the critical path.   (OR)

19.b) Calculate the earliest start earliest finish, Latest start and latest finish of each activity of the project given below and determine the critical path of the project.

Activity	1-2	1-3	1-5	2-3	2-4	3-4	3-5	3-6	4-6	5-6
Duration	8	7	12	4	10	3	5	10	7	4

20.a) Summarize the Essential features of Game Theory. (OR)
20.b) Analyze the Maximin and Minixax principle.

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