

(FOR THE CANDIDATES ADMITTED

23UPA6E4

DURING THE ACADEMIC YEAR 2023-2024 ONLY)

REG.NO. :

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS: MAY 2026

B.COM PA

MAXIMUM MARKS: 75

SEMESTER: VI

TIME : 3 HOURS

PART – III
OPERATIONS RESEARCH

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. In an LPP the solution for the problems involving only 2 variables can be solved using _____.
 - a. Graphical method
 - b. Simplex method
 - c. Hungarian method
 - d. All the above
2. The Objective function of Transportation problem is to _____.
 - a. maximizes the total cost
 - b. minimizes or maximizes the total cost
 - c. minimizes the total cost
 - d. total cost should be zero
3. Which of the following is not an assignment problem?
 - a. Assigning jobs to machines
 - b. Assigning workers to jobs
 - c. Assigning workers to a different department
 - d. Assigning wages to workers
4. Which of the following is used for computations in CPM?
 - a. pessimistic time
 - b. optimistic time
 - c. normal time
 - d. most likely time
5. In game theory, a strategy refers to _____.
 - a. A single action taken by a player
 - b. A complete plan of action for every possible situation
 - c. The payoff received by a player
 - d. The opponent's decision

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. Define: LPP.
7. Define balanced transportation problem.
8. What is an assignment problem?
9. Show the formula for expected time in PERT.
10. Explain zero-sum game?

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Examine the standard form of the following LPP

$$\text{Max } z = 3x_1 + 7x_2$$

Subject to

$$-2x_1 + x_2 \leq 1$$

$$x_1 \leq 2$$

$$x_1 + x_2 \leq 3 \quad \& \quad x_1, x_2 \geq 0.$$

(OR)

- b) List out the procedure for solving LPP in graphical method.
12. a) Find initial basic feasible solution by North West corner method.

			Supply	
	8	7	3	6
	3	8	9	7
	11	3	5	8
Demand	5	8	8	

(OR)

- b) Find initial basic feasible solution by least cost method.

			Supply	
	2	2	3	10
	4	1	2	15
	1	3	1	40
Demand	20	15	30	

13. a) Solve the following Assignment Problem.

	Job			
clerk	1	2	3	4
1	—	5	2	0
2	4	7	5	6
3	5	8	4	3
4	3	6	6	2

(OR)

- b) In a factory, there are six jobs to perform, each of which should go through two machines A and B, in the order A, B. The processing timings (in hours) for the jobs are given here. Find the sequence for performing the jobs that would minimize the total elapsed time, T. What is the value of T?

Job	1	2	3	4	5	6
Machine A	1	3	8	5	6	3
Machine B	5	6	3	2	2	10

14. a) Describe the rules for constructing a network diagram.

(OR)

- b) Sketch & Draw a network diagram for the following

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

15. a) Solve the following game whose payoff matrix is given below

$$\begin{pmatrix} 3 & 2 & 4 & 0 \\ 5 & 4 & 6 & 4 \\ 4 & 2 & 4 & 0 \\ 0 & 4 & 0 & 8 \end{pmatrix}$$

(OR)

- b) Solve the game whose payoff matrix is given by

$$\begin{pmatrix} 3 & 5 & 3 \\ 2 & -2 & -1 \\ 3 & 7 & 1 \end{pmatrix}$$

SECTION – C **(5 X 8 = 40 MARKS)**
ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K4 (Or) K5)

16. a) Solve the following LPP by graphical method.

$$\begin{aligned} \text{Max } Z &= 3x_1 + 4x_2 \\ \text{Subject to } 4x_1 + 2x_2 &\leq 80 \\ 2x_1 + 5x_2 &\leq 180 \quad \& \quad x_1, x_2 \geq 0. \end{aligned}$$

(OR)

b) ABC animal feed company must produce at least 200kg of a mixture consisting of ingredients A and B daily. A costs Rs. 3 per kg and B costs Rs.5 per kg. Not more than 80 kg of A can be used and at least 60 kg of B must be used. Outline an LPP to minimize the cost.

17.a) Determine an initial basic feasible solution to the following transportation problem using VAM method.

Source	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	

(OR)

b) Discuss the procedure for solving transportation problem under U-V method.

18. a) Solve the following Assignment Problem.

	Job		
Task	1	2	3
I	9	26	15
II	13	27	6
III	35	20	15
IV	18	30	20

(OR)

b) Determine the optimal sequence of jobs that minimizes the total elapsed time based on the following information processing time on machines is given in hours and passing is not allowed

Job	A	B	C	D	E	F	G
Machine 1	3	8	7	4	9	8	7
Machine 2	4	3	2	5	1	4	3
Machine 3	6	7	5	11	5	6	12

19. a)

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

Evaluate Critical Path and Duration.

(OR)

b)

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
A	1	1	2	1	2	2	3
M	1	4	2	1	5	5	6
B	7	7	8	1	14	8	15

1. Draw a project network diagram

2. Calculate the expected duration and variance of each activity.

20. a) Using dominance property solve the game

$$\begin{pmatrix} -5 & 3 & 1 & 20 \\ 5 & 5 & 4 & 6 \\ -4 & -2 & 0 & -5 \end{pmatrix}$$

(OR)

b) Classify the types of Game Theory.
