22CBA208N

PSG COLLEGE OF ARTS & SCIENCE

(AUTONOMOUS)

BCom DEGREE EXAMINATION MAY 2025

(Second Semester)

Branch – **COMMERCE (BUSINESS ANALYTICS)**

OPTIMIZATION TECHNIQUES FOR BUSINESS ANALYTICS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	What is the primary goal of Linear Programming? a) Maximization or Minimization b) Only Maximization c) Only Minimization d) None of these	K1	CO1
	2	The Graphical method can solve LPP with how many variables? a) 1 b) 2 c) 3 d) More than 3	K1	CO1
2	3	Which method is used to solve an Assignment Problem? a) MODI Method b) Simplex Method c) Hungarian Method d) Dual Simplex Method	K1	CO2
	4	In a transportation problem, what is the first step? a) Finding the optimal solution b) Constructing the transportation table c) Applying MODI method d) Performing network analysis	K1	CO2
3	5	Which of the following is a two-person zero-sum game? a) Chess b) Rock-Paper-Scissors c) Stock Trading d) Monopoly	K1	CO3
	6	What does the Maximin principle focus on? a) Maximizing the smallest gain b) Minimizing the largest gain c) Random strategy selection d) Cooperative gameplay	K1	CO3
4	7	Which of the following is used to identify the longest path in a project network? a) Hungarian Method b) MODI Method c) Critical Path Method d) Simplex Method	K1	CO4
	8	What does PERT stand for? a) Process Evaluation & Review Technique b) Program Evaluation & Review Technique c) Probability Estimation & Review Technique d) Project Execution & Risk Technique	K1	CO4
5	9	What is the purpose of sequencing problems? a) To assign resources to projects b) To determine the order of job processing c) To minimize network delays d) To maximize job delays	K1	CO5
	10	What does 'n jobs, k machines' represent in sequencing problems? a) Jobs processed in one stage b) Jobs processed in multiple machines c) Each job has different completion time d) Jobs are completed randomly	K1	CO5

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the standard and canonical forms of LPP with examples.	K1	CO1
		(OR)		
	11.b.	Solve the following LPP using the graphical method: Maximize $Z = 4x + 6y$ Subject to: $2x + y \leq 8$ $x + 2y \leq 6$ $x, y \geq 0$	K4	
2	12.a.	Explain the steps involved in the MODI method for optimizing a transportation problem.	K5	CO2
		(OR)		
	12.b.	Solve the following assignment problem using the Hungarian Method:	K4	

	Job 1	Job 2	Job 3	Job 4
Worker A	5	3	2	7
Worker B	6	8	4	5
Worker C	7	5	6	4
Worker D	5	6	8	3

Cont...

3	13.a.	Explain the concept of saddle points and dominance property in game theory.	K5	CO3
		(OR)		
	13.b.	Solve the following game using the maximin-minimax principle: Player | Player B | Player B Player A - Strategy X1 | 2 | -3 Player A - Strategy X2 | 1 | 4	K4	
4	14.a.	Explain the rules of network construction and how to determine the critical path.	K3	CO4
		(OR)		
	14.b.	A project has the following activities and durations. Find the critical path. Activity | Predecessor | Duration (days) A | - | 3 B | A | 4 C | A | 2 D | B, C | 5 E | D | 6	K4	
5	15.a.	Explain Johnson's rule for solving sequencing problems with two machines.	K5	CO5
		(OR)		
	15.b.	Solve a sequencing problem for three jobs processed on two machines.	K3	

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks $(3 \times 10 = 30)$

Module No.	Question No.	Question	K Level	CO
1	16	Solve the following Linear Programming Problem using the graphical method: Maximize $Z = 5x + 3y$ Subject to: $2x + y \leq 10$ $x + 3y \leq 15$ $x, y \geq 0$	K4	CO1
2	17	Solve the following transportation problem using the MODI method: | | D1 | D2 | D3 | Supply S1 | 4 | 8 | 9 | 20 S2 | 2 | 6 | 7 | 15 S3 | 3 | 4 | 5 | 25 Demand | 10 | 15 | 35 |	K4	CO2
3	18	Consider the following game theory payoff matrix. Find the optimal strategies and value of the game. Player | Player B | Player B Player A - Strategy X1 | 1 | 4 Player A - Strategy X2 | 3 | 2	K5	CO3
4	19	Draw a project network and determine the critical path for the following activities: Activity | Predecessor | Duration (days) A | - | 3 B | A | 5 C | A | 2 D | B, C | 4 E | D | 6	K4	CO4
5	20	A sequencing problem has 4 jobs (J1, J2, J3, J4) to be processed through 3 machines (M1, M2, M3). The processing times (in hours) are as follows: Job | M1 | M2 | M3 J1 | 3 | 5 | 2 J2 | 6 | 2 | 4 J3 | 4 | 3 | 6 J4 | 2 | 4 | 3 Find the optimal sequence using Johnson's Rule for 3 machines and calculate the minimum makespan.	K4	CO5

Z-Z-Z END