

COURSE CODE - 3030602
PG DIPLOMA EXAMINATION- JAN 2009
PGDBA / PGDBM

APPLIED OPERATIONS RESEARCH AND STATISTICS
(For the Candidates Admitted from Calendar Year 2007 Onwards)
Time: 3 hours **Max. Marks 75**

Section-A

Answer All Questions: **15X1=15**

1. Define slack variable.
2. State the artificial variable techniques of solving LPP.
3. State the feasible condition for Transportation problem.
4. What are the methods of solving (Feasible solution) transportation problem.
5. When a given assignment problem will be called as unbalanced.
6. State the method of solving assignment problem.
7. What is the need for balancing in an assignment problem
8. Define fair game
9. What are the limitation of dominance rule
10. define pure strategy
11. What is two person zew sum game
12. Define value of the game.
13. Define probability
14. What is discrete random variable
15. What is the probability of selecting a leap year contains 53 Sundays,

Section – B

Answer any Five Questions: **5X6=30**

16. a. Explain the essential characteristics of LPP.

(Or)

- b. Solve the following LPP by graphical method.

$$\text{Max } Z = 3X_1 + 2X_2 \text{ subject to } -2X_1 + X_2 \leq 1, X_1 \leq 2,$$

$$X_1 + X_2 \leq 3 \text{ and } X_1, X_2 \geq 0$$

17. a. Give the mathematical formulation of a transportation problem

(Or)

- b. Find the initial basic feasible solution by NWCR

	1	2	3	4	Supply
	21	16	25	13	11
	17	18	14	23	13
	32	27	18	41	19
Demand	6	10	12	15	

18. a. What are assignment problems? Describe mathematical formulation of an assignment problem?

(Or)

- b. Solve the following assignment problem

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

19. a. Explain the terms i. Pay off matrix ii. Dominance property

(Or)

b. Solve the game whose pay off matrix is given by

	Player B		
Player A	1	3	1
	0	-4	-3
	1	5	-1

20. a. State and prove addition theorem.

(Or)

b. A bag contains 8 red balls and 5 white balls. To successive drawings of 3 balls a made with replacement. Find the probability that the first drawing will give 3 white balls and the second 3 red balls.

Section – C

Answer any Two Questions:

2X15=30

21. Use simplex method to solve the LPP

$$\text{Max } Z = 4X_1 + 10X_2 \text{ subject to } 2X_1 + X_2 \leq 50$$

$$2X_1 + 5X_2 \leq 100, 2X_1 + 3X_2 \leq 90 \text{ and } X_1, X_2 \geq 0$$

22. Find the optimum solution to the following transportation problem

	1	2	3	Availability
I	7	3	2	2
II	2	1	3	3
III	3	4	6	5
Demand	4	1	5	10

23. Solve the following assignment problem

		Machines			
		M₁	M₂	M₃	M₄
Jobs	J₁	5	7	11	6
	J₂	8	5	9	6
	J₃	4	7	10	7
	J₄	10	4	8	3

24. Solve graphically

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

25. A company has t plans to manufacture scooters. Plant I

Produces 80% of the Scooters and plant II produces 20%. At plant I, 85 out of 100 scooters are rated as standard quality. At plant II, 65 out of, 100 Scooters are rated as standard quality

What is the probability that a randomly selected standard scooter was produced by plant I.