(7 pages) **Reg. No. :** .....

Code No. : 8438 **Sub. Code : C 24 K**

M.Com. (CBCS) DEGREE EXAMINATION,
APRIL 2011.

Second Semester

Commerce

OPERATIONS RESEARCH

(For those who joined in July 2008 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. What is ionic modeling?

2. State any two limitations of OR.

3. What is an artificial variable?

4. What is an infeasible solution?

5. How is degeneracy located in transportation?

6. What is an assignment problem?

7. What is saddle point?

8. What do you mean by Zero-sum game?

9. 'Simulation is the method of last resort'. Do you agree?

10. Mention the different types of simulation models.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the scope of Operations Research.

Or

(b) State the characteristics of Operations Research.

12. (a) Two products X and Y, consume three materials. A, B and C. The units of materials required per unit of X and Y, contribution per unit of X and Y and maximum availability of A, B and C are tabled below as follows :

	X	Y	Availability
A	4	2	48
B	3	7	84
C	4	5	60
Unit contribution	28	42	

Formulate the problem as an LPP.

Or

(b) Solve graphically the following LPP

Maximize $14x + 21y$

Subject to $2x + y \leq 24$

$1.5x + 3.5y \leq 42$

$2x + 2.5y \leq 30$

$x, y \geq 0$.

13. (a) The cost of transporting good per truck load from M sources to N destinations are as under. The supply position and requirements are also as under. Develop the first solution using NWCR.

	D1	D2	D3	Supply
S1	18	16	10	200
S2	4	7	12	225
S3	19	28	41	250
S4	22	16	5	275
Requirement	418	317	215	950

Or

(b) State the differences between transportation and assignment problems.

14. (a) Graphically solve game :

	A_1	A_2
B_1	4	6
B_2	-2	12
B_3	12	-10

Or

(b) What are the properties of a game?

15. (a) State the limitations of simulation.

Or

(b) Bring out the applications of simulation.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

16. (a) Examine the nature and role of operations research.

Or

(b) Discuss the various methods of operations research.

17. (a) Solve the LPP using simplex model.

Maximize $10a + 12b$

Subject to $2a + b \leq 60$

$3a + 4b \leq 120$

$a, b \geq 0$.

Or

(b) Use graphical method to solve the following LPP :

Maximize $z = 120x_1 + 100x_2$

Subject to the constraints $10x_1 + 5x_2 \leq 80$

$6x_1 + 6x_2 \leq 66$

$4x_1 + 8x_2 \geq 24$

$5x_1 + 6x_2 \leq 90$

$x_1 \geq 0$ and $x_2 \geq 0$

18. (a) A firm has 3 factories, A, B and C and equal number of sales territories X, Y and Z. Excluding transportation cost, the per unit income , i.e , the ex-factory incomes are Rs. 10, 9 and 11 at these factories. The transportation cost and capacities are as under :

From	To X	To Y	To Z	supply
A	1	2	3	1000
B	5	3	4	800
C	3	5	3	1200
Demand	800	1200	1000	3000

Optimize the transportation cost of the firm.

Or

(b) Make optimum assignment for the following :

	J1	J2	J3
M1	10	12	8
M2	12	24	20
M3	12	10	9
M4	24	15	16

19. (a) For the game with the following pay-off matrix, determine the optimum strategies and the value of the game :

$$\begin{array}{c} \\ P_1 \end{array} \begin{array}{c} P_2 \\ \begin{pmatrix} 5 & 1 \\ 3 & 4 \end{pmatrix} \end{array}$$

Or

(b) Solve the following 2×3 graphically :

$$\begin{array}{c} \\ \text{Player A} \end{array} \begin{array}{c} \text{Player B} \\ \begin{pmatrix} 1 & 3 & 11 \\ 8 & 5 & 2 \end{pmatrix} \end{array}$$

20. (a) What is Monte Carlo simulation? State its advantages.

Or

(b) Patients arriving at a village dispensary are treated by a doctor on a first-come-first-

served basis. The inter-arrival time of the patients is known to be uniformly distributed between 0 and 80 minutes, while their service time is known to be uniformly distributed between 15 and 45 minutes. it is desired to simulate the system and determine the average time a patient has to be in the queue for getting service and the proportion of time the doctor would be idle.

Carry out the stimulation using the following sequences of randoms numbers. The numbers have been selected between 00 and 80 to estimate inter-arrival times and between 15 and 40 to estimate the service times required by the patients.

Series 1 : 07, 21, 12, 80, 08,

Series 2 : 23, 37, 16, 28, 30,

Series 1 : 03, 32, 65, 43, 74,

Series 2 : 18, 25, 34, 19, 21
