

(7 pages)

Reg. No. :

Code No. : 7770

Sub. Code : HKCM 23/
HKAM 23

M.Com. / M.Com with Computer Application (CBCS)
DEGREE EXAMINATION, APRIL 2016.

Second Semester

Commerce / Commerce with Computer Application
OPERATIONS RESEARCH

(For those who joined in July 2012 and afterwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer :

1. _____ models are easy to observe, build and describe but difficult to manipulate.
(a) Iconic model (b) Abstract model
(c) Analogue model (d) Symbolic model
2. Operations Research is the art of giving bad answers to problems which otherwise have _____ answers.
(a) Bad (b) Worse
(c) The worst (d) The best

3. The area in the graph satisfying all constraints and non-negativity condition is called
(a) Critical Region (b) Rejection Region
(c) Feasible Region (d) None of these
4. For a minimization problem, if the feasible region is unbounded on the right hand and/or upper side, then the problem has
(a) An infeasible solution
(b) Unbounded solution
(c) Optimal solution
(d) Multiple solutions
5. The method which uses the smallest cost in a row to find the initial basic feasible solution is called
(a) Column minima method
(b) Vogel's Approximation Method
(c) Row Minima method
(d) Least Cost method
6. The rule for drawing straight lines in an assignment problem is
(a) Draw straight lines through all unmarked rows and marked columns
(b) Draw straight lines through all marked rows and unmarked columns
(c) Draw straight lines through all unmarked rows and unmarked columns
(d) Draw straight lines through all marked rows and marked columns

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7. The dominance rule for a row is that if all the elements in a n^{th} row are less than or equal to the corresponding elements in r^{th} row then
- n^{th} row is the dominating row
 - r^{th} row is the dominating row
 - r^{th} row is the dominated row
 - None of these
8. The payoff at the saddle point is called
- Value of the game
 - Minimax
 - Maximin
 - Equilibrium point
9. Simulation model based on random number is called
- Static
 - Dynamic
 - Deterministic
 - Probabilistic
10. Which of the following is a disadvantage of simulation?
- Time compression capability
 - Inability to analyse large and complex problems
 - Not easily transferable to other problems
 - Could interfere with real-world systems

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) What is the role of O.R. in decision making?

Or

- (b) What are the limitations of O.R.?

12. (a) Solve graphically the following LPP.

$$\max Z. 5x_1 + 3x_2$$

$$\text{Subject to : } x_1 + x_2 \leq 2; \quad 5x_1 + 2x_2 \leq 10; \\ 3x_1 + 8x_2 \leq 12; \quad x_1, x_2 \geq 0.$$

Or

- (b) A company produces 2 types of hats. Every hat 'A' requires twice as much as the second hat 'B'. If the company produces only hat 'B' it can produce a total of 500 hats a day. The market limits daily sale of the hat 'A' and hat 'B' to 150 and 250 hats. The profit on hat 'A' and 'B' are Rs. 8 and Rs. 5 respectively. Formulate LP model.

13. (a) What is degeneracy in transportation problems?

Or



- (b) Using NWCR find a basic feasible solution to the following transportation problem.

	1	2	3	4	a_i
I	21	16	25	13	11
II	17	18	14	23	13
III	32	27	18	41	19
b_j	6	10	12	15	43

14. (a) Solve the following game.

		Player B	
		B_1	B_2
Player A	A_1	1	7
	A_2	6	2

Or

- (b) What do you understand by zero-sum and non zero-sum games?
15. (a) Describe Monte Carlo method of simulation.
- Or
- (b) List out the reasons for using simulations.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Explain the different types of models used in O.R. Explain briefly the general methods for solving these OR models.

Or

- (b) Explain the scope of Operations Research.

17. (a) Obtain the optimum feasible solution.

	I	II	III	IV	V	
A	2	11	10	3	7	4
B	1	4	7	2	1	8
C	3	9	4	8	12	9
	3	3	4	5	6	

Or

- (b) Solve the following assignment problem.

	I	II	III	IV	V
1	11	17	8	16	20
2	9	7	12	6	15
3	13	16	15	12	16
4	21	24	17	28	26
5	14	10	12	11	15

18. (a) Solve the L.P.P by simplex method

$$\text{Maximize } z = 10x_1 + 12x_2$$

$$\text{Subject to } 3x_1 + 4x_2 \leq 24,000$$

$$5x_1 + 3x_2 \leq 30,000$$

$$x_1, x_2 \geq 0.$$

Or

- (b) Explain the significance of the following variables with examples.

- (i) Slack variables
- (ii) Surplus variables
- (iii) Artificial variables.



19. (a) Solve the game by graphical method.

19	6	7	5
7	3	14	6
12	8	18	4
8	7	13	-1

Or

- (b) Reduce the following game to 2×2 game and solve it.

	A	B	C	D
I	3	2	4	0
II	3	4	2	4
III	4	2	4	0
IV	0	4	0	8

20. (a) List the advantages, applications, limitations and the methodology of simulation.

Or

- (b) The past data of demand per week of confectionary items in hundred kilograms is given below:

Demand per week: 0 5 10 15 20 25

Frequency: 2 11 8 21 5 3

Generate demand for next 10 weeks using random numbers given below. Also find the average demand per week (Random Nos: 78, 99, 43, 62, 44, 62, 67, 32, 54, 75).

