Roll No. | | | | | | | | | | | | |

Total No. of Pages: 04
Total No. of Questions: 09

MCA (Sem.-3rd)

COMPUTER BASED OPTIMIZATION TECHNIQUES

Subject Code: MCA-302
Paper ID: [B1158]

Time: 3 Hrs. **Max. Marks: 100**

INSTRUCTIONS TO CANDIDATE:

1. **Attempt any one question from each Section A,B,C,D and the entire Section-E.**
2. **Use of non-programmable Scientific Calculator is allowed.**

SECTION-A

Q.1.

(a) Explain Primal and Dual Problem. **05**

(b) Use Dual Simplex Method to Solve the Problem. **15**

Min $Z=2X_1+3X_3$

Subject to $2X_1-X_2-X_3 \geq 3$

$X_1-X_2+X_3 \geq 2$

Where $X_1, X_2, X_3 \geq 0$

Q2. (a) Limitation of Linear Programming Problems. **05**

(b) **Max** $Z= 17 X_1+51 X_2$ **15**

Subject to $X_1 + 16X_2 \leq 240$

$5X_1 + 2X_2 \leq 162$

$X_2 \leq 50$

Where as $X_1 \& X_2 \geq 0$

(i) Find the optimal solution to the L.P.P.

(ii) Discuss the effect of changing the availability from (230, 160, 40) to (240,150, 42).

SECTION-B

Q3. (a) Differentiate between Transport and assignment problem. **05**

(b) National oil Co. has three refineries and four Depots Transportation costs per ton & requirements are given below. **15**

	D1	**D2**	**D3**	**D4**	**Capacity**
P1	5	7	13	10	700
P2	8	6	14	13	400
P3	12	10	9	11	800
Requirement	300	600	700	400	

Determine optimal allocation of output.

Q4. Solve the Transportation Table to find Initial Basic Feasible Solution Using ***Least Cost Method.*** **20**

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	**5**	**8**	**7**	**14**	**34**

SECTION-C

Q5. The project manager of Apollo Corporation finds that the budgeted amount for advertising during the next quarter permits 8 insertions in the three newspapers. The Times of India (T) Bombay, the Hindu (H) Madras and the State man (S) Calcutta. The Company Solicits enquiries from prospective customers through the ads and the number of enquiries received is used as a measure of the efficiency of the ads. The average estimated number of enquiries per insertion for various numbers of insertions in the three newspapers is given below. **20**

No. of Insertion	Estimated Number of Enquiries		
	T	H	S
0	160	170	210
1	175	180	250
2	200	220	280
3	240	255	330
4	270	270	350
5	300	310	360
6	340	320	365
7	360	325	370
8	370	325	380

It will be that in each of newspaper, after a certain number of insertion the response remain static. This is because the response does not increase in direct proportion to the extent of advertising and reaches a saturation level. Using Dynamic Programming tell what should be the allocation of Insertion in each of newspaper in order to maximize the total number of enquiries?

Q6. What is dynamic programming? Explain some salient characteristics of this approach that distinguish it from other techniques of Operation research. **20**

SECTION-D

Q7. What do you mean by Integer Programming Explain it? And following is the final table of a maximizing Integer LP problem find the Integer optimal feasible solution. **20**

$C_j \rightarrow$			2	2	0	0
↓	Basic Variable	Solution value	X_1	X_2	S_1	S_2
	X_1	4/7	1	0	5/7	-3/14
2	X_2	12/7	0	1	-1/7	5/14
2	Z_j	32/7	2	2	8/7	2/7
		C_j-Z_j	0	0	-8/7	-2/7

Where X_1, X_2 are Integers.

Q8. Differentiate between a linear Programming and Integer Programming and Discuss Integer Programming using suitable example. **20**

SECTION-E

Q9. Explain the following: **20**

(a)	Linear Programming	2
(b)	Decision Theory	2
(c)	Branch and Bound Techniques	2
(d)	Graphical method for Goal programming	2
(e)	The transshipment problem?	2
(f)	The role of surplus variables in the simplex method	2
(g)	The advantages of revised simplex method over the original simplex method	2
(h)	Degeneracy in Linear programming problem	2
(i)	Feasible Solution.	2
(j)	Degeneracy in Transportation problem.	2

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