S.Y. B. SC. (Computer Science) SEM –IV (CBCS - 2016 COURSE) : WINTER - 2018

SUBJECT: OPTIMIZATION TECHNIQUES

Day: Tuesday
Date: 16/10/2018

W-2018-0923

Time: 03.00 PM TO 06.00 PM
Max. Marks: 60

N.B:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable **CALCULATOR** is allowed.

Q.1 Attempt **ANY TWO** of the following: **[12]**

a) Write the advantages of linear programming

b) Solve the following L.P.P. graphically, Maximize $Z = 4x_1 + 3x_2$

Subject to, $4x_1 + 3x_2 \leq 24$

$x_2 \leq 6$

$x_2 \leq 5$

$x_1, x_2 \leq 0$

c) Solve the following L.P.P. by simplex method:

Minimize $z = x_1 - 3x_2 + 2x_3$

Subject to, $3x_1 - x_2 + 2x_3 \leq 7$

$-2x + 4x_2 \leq 12$

$4x_1 + 3x_2 + 8x_3 \leq 10$

$x_1, y_2, x_3 \geq 0$

Q.2 Attempt **ANY TWO** of the following: **[12]**

a) Describe the steps for finding the initial solution by Vogel's approximation method.

b) Find initial basic Feasible solution of the following transportation problem by North West corner method

	W_1	W_2	W_3	W_4	Supply
F_1	30	25	40	20	100
F_2	29	26	35	40	250
F_3	31	33	37	30	150
Demand	90	160	200	50	

c) Solve the following transportation problem by Least cost method:

	P	Q	R	S	Supply
A	6	5	8	5	30
B	5	11	9	7	40
C	8	9	7	13	50
Demand	35	28	32	25	

P.T.O.

Q.3 Attempt **ANY TWO** of the following: **[12]**

a) Explain Hungarian method to solve assignment problem for minimization.

b) A marketing manager has 5 salesman and 5 sales districts. Considering the capacities of the salesman and the nature of districts, the marketing manager estimates the sales per month for each salesman in each district would be as follows:

		A	B	C	D	E
Salesman	I	32	38	40	28	40
	II	40	24	28	21	36
	III	41	27	33	30	37
	IV	22	38	41	36	36
	V	29	33	40	35	39

Find assignment of salesman to district that will result in maximum sale.

c) Reduce the following game by the dominance principle and find value of the game: $\begin{bmatrix} 8 & 10 & 9 & 14 \\ 10 & 11 & 18 & 12 \\ 13 & 14 & 14 & 13 \end{bmatrix}$.

Q.4 Attempt **ANY THREE** of the following: **[12]**

a) Find the dual of the following L.P.P:

minimize $z = 2x_1 + 2x_2$

subject to, $2x_1 + 4x_2 \geq 1$

$x_1 + 2x_2 \geq 1$.

$2x_1 + x_2 \geq 1$

$x_1, x_2 \geq 0$

b) Solve the following 2 x 4 game graphically

		Player B			
		B_1	B_2	B_3	B_4
Player A	A_1	2	1	0	−2
	A_2	1	0	3	2

c) Define the terms:

i) Two person zero sum game ii) Unstable game

d) Solve the following assignment problem:

	C_1	C_2	C_3
A_1	1	4	5
A_2	2	3	3
A_3	3	1	2

P.T.O.

Q.5 Attempt **ANY FOUR** of the following: **[12]**

a) Write the advantages of the dual of L.P.P.

b) Explain how to solve maximization assignment problem

c) Obtain the standard form of the following L.P.P.

Max $z = 2x + 3y$

subject to, $2x + 3y \geq 5$

$2x + 4y \geq 7$

$x, y \geq 0$

d) Determine the saddle point of the following game:

	B_1	B_2	B_3
A_1	1	3	1
A_2	0	−4	−3
A_3	1	5	−1

e) Determine whether following assignment problem is balanced? If not balanced it:

		Jobs			
		I	II	III	IV
Operator	A	3	2	1	5
	B	3	1	7	8
	C	7	6	4	10

f) Determine whether following solution is degenerate? Justify.

23 (2)	42	33	11
17 (2)	25 (1)	45	20
3	12	8 (5)	18 (7)

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