S.Y. B. SC. (Computer Science) SEM –IV (CBCS - 2016 COURSE) :
SUMMER - 2019
SUBJECT: OPTIMIZATION TECHNIQUES

Day: Tuesday
Date: 16/04/2019

Time: 11.00 AM TO 02.00 PM
Max. Marks: 60

S-2019-1099

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:

Minimize $z = x+3y$

Subject to, $3x+6y \geq 8$

$5x+2y \geq 10$

$x, y \geq 0$

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) 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	

c) Solve the following assignment problem for minimum cost:

	I	II	III	IV	V
A	11	17	8	16	20
B	9	7	12	6	15
C	13	16	15	12	16
D	21	24	17	28	26
E	14	10	12	11	15

P.T.O.

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

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

b) Solve the following game using graphical method

		Player B	
		B_1	B_2
Player A	A_1	-7	6
	A_2	7	-4
	A_3	-4	-2
	A_4	8	-4

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) Solve the following assignment problem for minimum cost, where '–' represent no assignment of job to that respective machine.

		Machine			
		A	B	C	D
Jobs	1	4	7	5	6
	2	–	8	7	4
	3	3	–	5	3
	4	6	6	4	2

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

minimize $z = 2x_1 + 2x_2$

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

$x_1 + 2x_2 \geq 1$.

$2x_1 + x_2 \geq 1$

$x_1, x_2 \geq 0$

c) Solve the following game by a algebraic method:

		Player B	
		A	B
Player A	I	20	–6
	II	–4	3

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) Define: i) Value of the game ii) Saddle point

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

Max $z = 2x + 3y$

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

$2x + 4y \geq 7$

$x, y \geq 0$

c) 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

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

e) 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

f) Explain the unbalanced transportation problem.

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