S.Y. B. SC. (COMPUTER SCIENCE) SEM –IV (CBCS - 2016 COURSE) : SUMMER - 2018

SUBJECT: OPTIMIZATION TECHNIQUES

Day: **Thursday** Time: **11.00 A.M. TO 02.00 PM**

Date: **19/04/2018** **S-2018-0822** 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) Solve the following L.P.P. graphically,

Maximize $Z = 4x_1 + 3x_2$

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

$x_2 \leq 6$

$x_2 \leq 5$

$x_1, x_2 \leq 0$

b) Solve the L.P.P. by using simplex method: maximize $z = 4x_1 + 3x_2$

Subject to, $6x_1 + 2x_2 \leq 36$

$5x_1 + 5x_2 \leq 40$

$2x_1 + 4x_2 \leq 28$

$x_1, x_2 \leq 0$

c) 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.

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

a) 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	

b) Solve the following transportation problem by Vogel's approximation method:

	D_1	D_2	D_3	Supply
P_1	9	6	0	5
P_2	5	1	0	20
P_3	3	2	4	10
P_4	7	5	2	15
Demand	25	10	15	

c) 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

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

a) Define the terms: i) Two person zero sum game ii) Unstable game

iii) Value of the game

b) Let the pay-off matrix be given below:

		Firm B	
		I	II
Firm A	I	20	-6
	II	-8	2
	III	-4	3

Find the value of the game and optimum strategies for both A and B using Subgame method.

c) Reduce the following game by the dominance principle and find optimal solution.

	I	II	III
1	20	25	-50
2	6	10	-10
3	40	18	30

Q.4 Attempt any three of the following: **[12]**

a) Solve the following assignment problem

		Men			
		A	B	C	D
Jobs	1	10	25	15	20
	2	15	30	5	15
	3	35	20	12	24
	4	17	25	24	20

P.T.O.

b) A manufacture of cookers produces three models. The production capacities of the various departments in the terms of operator hour per week are machinery 3600, welding 3000, assembly 3000, painting 2400.

	Operator hours			
Model	Machining	Welding	Assembly	Painting
Diana	2	2	4	1
Helen	3	3	3	1
Panda	4	3	3	3

Expected profit per unit is for Diana ₹ 120, Helen ₹ 140, Panda ₹ 180.
Formulate L.P.P. to maximize profit.

c) Write the dual of the following L.P.P. :

Minimize $z = 3x - 5y$

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

$x - 2y \geq 5$

$3x + 5y \geq 12$

$x, y \geq 0$

d) Solve the following unbalanced assignment problem.

	I	II	III
A	9	12	11
B	8	13	17
C	20	12	13
D	21	15	17

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

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

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

Maximize z = 2x + 3y

Minimize $z = 3x + 5y$

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

$2x - 4y \leq 7$

$x, y \geq 0$

c) Explain how to solve maximization assignment problem

d) Consider the following pay-off matrix $\begin{bmatrix} 8 & 6 & 2 & 8 \\ 8 & 9 & 4 & 5 \\ 7 & 5 & 3 & 5 \end{bmatrix}$, determine the saddle point if exists.

e) Define : i) Basic solution ii) Optional solution

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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