

Bachelor of Science (Information Technology) (I.T.) Semester-VI (CBS) Examination

OPERATION RESEARCH

Paper—6

Time : Three Hours]

[Maximum Marks : 50

N.B. :— (1) **All** questions are compulsory and carry equal marks.

(2) Draw neat and labelled diagram wherever necessary.

EITHER

1. (A) Use the Simplex method to solve the following LP problem :

Maximize :

$$Z = 3x_1 + 5x_2 + 4x_3$$

subject to :

$$2x_1 + 3x_2 \leq 8$$

$$2x_2 + 5x_3 \leq 10$$

$$3x_1 + 2x_2 + 4x_3 \leq 15$$

and $x_1, x_2, x_3 \geq 0$

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(B) Solve the following LP problem, using two phase simplex method :

Minimize :

$$Z = 2x_1 + x_2$$

subject to :

$$5x_1 + 10x_2 - x_3 = 8$$

$$x_1 + x_2 + x_4 = 1$$

and x_1, x_2, x_3 all ≥ 0

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OR

(C) Define Graphical solution of two-variable LP problems.

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(D) Solve the following LPP by using Big-M method :

Minimize :

$$Z = 2y_1 + 3y_2$$

subject to constraints :

$$y_1 + y_2 \geq 5$$

$$y_1 + 2y_2 \geq 6$$

where $y_1, y_2 \geq 0$

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EITHER

2. (A) Explain North West corner rule with example. 5
- (B) Solve the following assignment problem :

		Machines				
		I	II	III	IV	V
Men	A	1	5	3	2	8
	B	2	7	9	2	6
	C	3	6	4	5	7
	D	4	5	7	7	8

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OR

- (C) Explain the relation between primal and dual problems. 5
- (D) Solve the following Vogel's approximate method :

Plants	1	2	3	4	Supply
	2	3	11	17	6
	1	0	6	1	1
	5	8	15	9	10
Re quirements	7	5	3	2	

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EITHER

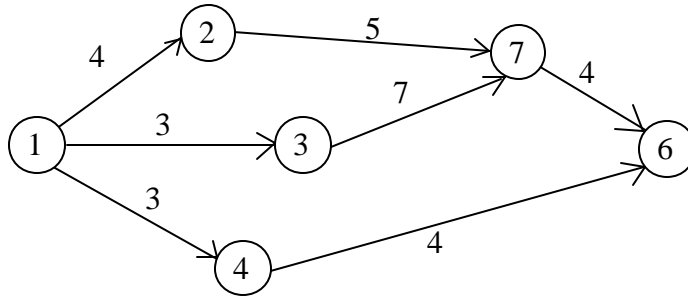
3. (A) Write the application of Network Techniques. 5
- (B) The activity involved in the system installation process are detailed below. Draw the network diagram :

Activity	Predecessor Activity
A	—
B	—
C	B
D	A
E	C
F	C
G	F
H	F
I	H
J	I
K	I
L	I
M	K, L

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OR

(C) What is critical path ? Give its importance. Find critical path for the following network.



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(D) Define the following terms :

- (i) Activity
- (ii) Event
- (iii) Looping
- (iv) Dangling
- (v) Dummy.

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EITHER

4. (A) Write the steps of Hungarian methods.

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(B) Using bounded variable simplex method, solve the L.P.P. :

Maximize :

$$Z = 3x_1 + x_2 + x_3 + 7x_4$$

subject to the constraints :

$$2x_1 + 3x_2 - x_3 + 4x_4 \leq 40$$

$$-2x_1 + 2x_2 + 5x_3 - x_4 \leq 35$$

$$x_1 + x_2 - 2x_3 + 3x_4 \leq 100$$

$$x_1 \geq 2, x_2 \geq 1, x_3 \geq 3, x_4 \geq 4$$

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OR

(C) Write the steps of Bounded variable method.

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(D) Explain zero-one programming model.

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5. Attempt **all** :

(A) Write notes on :

- (a) Feasible solution
- (b) Infeasible solution.

2½

(B) Define the Transposition model.

2½

(C) Give the recursive nature of dynamic programming.

2½

(D) Explain types of Assignment problem.

2½