Voc(Sem-V) —
BCA (DSE – 1)

2023

Time : 3 hours

Full Marks : 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

*Answer from **all** the Sections as directed.*

Section – A

(Objective Type Questions)

1. Select the correct answer of the following :

    $$1×5 = 5$$

    (a) The following is an example of a linear function :

    (i) $f : R^2 \to R$ given as $f(x, y) = 2x + 3y$

    (ii) $f : R^2 \to R$ given as $f(x, y) = 2x + 3y - 1$

    (iii) $f : R^2 \to R$ given as $f(x, y) = 2x + 3y + 1$

    (iv) None of these

    (b) The feasible region of an LPP is a :

    (i) Convex set

KV – 3/3   (Turn over)

(ii) Non-convex set

(iii) Both (i) & (ii)

(iv) None of these

(c) The objective function of an LPP is a :

(i) Linear function

(ii) Non-linear function

(iii) Both (i) and (ii)

(iv) None of these

(d) Feasible region is the set of points which satisfies :

(i) The objective function

(ii) Some of the given constraints

(iii) All of the given constraints

(iv) None of these

(e) The feasible solution of an LPP which gives the best value to the objective function is called :

(i) General solution

(ii) Optimal solution

(iii) Particular solution

(iv) None of these

2. Fill in the blanks of the following : 1×5 = 5

(a) The region inside a circle is an example of a

_____ set.

(b) The full form of PERT is _____.

(c) The Floyd algorithm is used to find _____.

(d) The Ford-Fulkerson algorithm is used to find

_____.

(e) The set of constraints in an LPP identify the

_____ region.

Section – B

(Short-answer Type Questions)

3. Answer any **four** questions of the following :

5×4 = 20

(a) Solve the linear system :

$$x + y + z = 4$$

$$3x - y - z = 2$$

$$x + 3y + 3z = 8$$

(b) Find the rank of the matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ -1 & -2 & -2 \end{bmatrix}$$

(c) Solve the following 2 × 2 game :

Player B

		Strategy I	Strategy II
Player A	Strategy I	1	7
	Strategy II	6	2

(d) Show that the union of two convex sets need not be convex.

(e) What are the differences between PERT and CPM ?

(f) Write a short note on Fulkerson Algorithm with an example.

Section – C

(Long-answer Type Questions)

4. Answer any **four** questions of the following :

$$10 \times 4 = 40$$

(a) Solve the LPP graphically :

Max $Z = 5x + 3y$ subject to $x + y \leq 300$

$D = 0, 300$ $B = 300, 0$ $2x + y \leq 360$
$C = 10, 240$ $x, y \geq 0$

(b) Solve the LPP by simplex method :

Max $Z = 5x + 7y$

subject to $2x + 3y \leq 13$
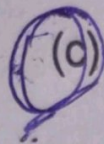
$3x + 2y \leq 12$

$x, y \geq 0$

(c) Show that the intersection of two convex sets is also a convex set.

(d) Solve the following game using principle of dominance method :

Player B / Player A	Strategy I	Strategy II	Strategy III	Strategy IV
Strategy I	3	2	4	0
Strategy II	3	4	2	4
Strategy III	4	2	4	0
Strategy IV	0	4	0	8

(e) Obtain the initial basic feasible solution of the given transportation problem whose cost and requirement table is given below using least cost method :

Destination origin	D_1	D_2	D_3	Supply
O_1	2	7	4	5
O_2	3	3	1	8
O_3	5	4	7	7
O_4	1	6	2	14
Demand	7	9	18	34

(f) Write short note on PERT and CPM.

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