 Voc(Sem-V) — BCA
(DSE – 1)

2021

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) Operation Research is a/an _____.

(i) Science

(ii) Art

(iii) Mathematics

(iv) Both (i) and (ii)

(b) Objective function of a Linear Programming Problem is :

(i) A constraint

(ii) Function to be optimized

(iii) A relation between the variables

(iv) None of these

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

(i) The objective functions

(ii) Some of the given constraints

(iii) All of the given constraints

(iv) None of these

(d) Inequation $3x - y \geq 3$ and $4x - 4y \geq 4$:

(i) Have solution for positive x and y

(ii) Have no solution for positive x and y

(iii) Have solution for all x

(iv) Have solution for all y

(e) Hungarian method for solving an assignment problem can also be used to solve by _____.

(i) A transportation problem

(ii) A travelling salesman problem

(iii) A LP problem

(iv) Both (i) and (ii)

2. Fill up the blanks : $1 \times 5 = 5$

(a) The transportation problem is basically a Maximization model

(b) The objective functions and constraints are linear relationship between variable.

(c) The column, which is introduced in matrix to balance the rim requirements, is known as dummy column

(d) The value of x in $(3x + 1) = 6$ is 5/3.

(e) Full form of CPM is _____.

Section – B

(Short-answer Type Questions)

Answer any **four** questions (Answers to be not more than **200** words each) : $5 \times 4 = 20$

3. (a) What is vector and what are the types of vector ? Find dot product of two vectors having magnitudes of 6 units and 7 units angle between the vectors is 60°.

(b) What is the difference between PERT and CPM ?

(c) What is convex set in LPP ? Describe with example.

(d) Write the Simplex Algorithm.

(e) Solve the equation of L and find value of x and y :

$$x + 3 = 2(y - 1) \text{ and } (y + 1) = 5x$$

(f) What is linear algebra and its application ? Also, describe the elementary terms of LA.

Section – C

(Long-answer Type Questions)

4. Answer any **four** questions : 10×4 = 40

(a) What is Hungarian Method ? Write the steps with example.

(b) What is degeneracy in L. P. Problem and how it is resolved ?

(c) Write the steps of transportation algorithm with suitable example.

(d) Maximize $Z = 2x + 5y$

The constraints are $x + 4y \leq 24$

$3x + y \leq 21$

and $x + y \leq 9$

where, $x \geq 0$ and $y \geq 0$.

Solve this problem using graphical method.

(e) Find the solution of game theory problem using saddle point..

Player A / Player B	B1	B2	B3	B4
A1	20	15	12	35
A2	25	14	8	10
A3	40	2	10	5
A4	–5	4	11	0

(f) What is Optimization Problems ? How Linear Programming is used in optimization ? Give example.