

✓  
NP – 440

VI Semester B.C.A. Examination, July/August 2024  
(NEP)

COMPUTER SCIENCE

CAE2 : a) Operations Research (Elective – II)

Time : 2½ Hours

Max. Marks : 60

- Instructions :** 1) Answer **all** Sections.  
2) Answer **any four** questions from **each** Section.

SECTION – A

- I. Answer **any four** questions. **Each** question carries **2** marks. (4×2=8)

- 1) What is operational research ?
- 2) Define slack and surplus variables.
- 3) What is unbalanced transportation problem ?
- 4) Define saddle point and value of the game.
- 5) What are the applications of PERT/CPM Techniques ?
- 6) What is pay off matrix ? Give example.

SECTION – B

- II. Answer **any four** questions. **Each** question carries **5** marks. (4×5=20)

- 7) Solve the following LPP by Graphical method.

$$\text{Maximize, } z = 3x + 4y$$

$$\text{Subject to } 4x + 8y \leq 32$$

$$9x + 2y \geq 14$$

$$3x + 10y \geq 30 \text{ where } x, y \geq 0.$$

- 8) Explain the applications of operational research.
- 9) Using North West Corner Rule to obtain an initial basic feasible solution of the given transportation problem.

					Supply	
Demand	A	3	1	7	4	300
	B	2	6	5	9	400
	C	8	3	3	2	500
		250	350	400	200	

P.T.O.



- 10) Explain Hungarian method for solving Assignment problem.
- 11) a) Define optimality test.  
b) Explain modified distribution method in detail.
- 12) A project schedule has the following characteristic.

Activity	1 – 2	1 – 3	2 – 4	3 – 4	2 – 5	4 – 5
Time (Days)	13	12	2	8	15	2

- 1) Construct Network Diagram.
- 2) Compute the earliest event time.
- 3) Determine the critical path and total project duration.

### SECTION – C

III. Answer **any four** questions. **Each** question carries **8** marks.

(4×8=32)

- 13) Solve the following LPP by simplex method.

8

$$\text{Maximize } Z = 2x_1 + 2x_2 + 4x_3$$

$$\text{Subject to } 2x_1 + 3x_2 + x_3 \leq 240$$

$$x_1 + x_2 + 3x_3 \leq 300$$

$$x_1 + 3x_2 + x_3 \leq 300$$

$$\text{where } x_1, x_2, x_3 \geq 0$$

- 14) a) Write the steps to find initial basic feasible solution by matrix minima method.

4

- b) Consider the job of assigning 5 jobs to 5 persons. Find the assignment cost from the table.

4

	1	2	3	4	5
A	8	4	2	6	1
B	0	9	5	5	4
C	3	8	9	2	6
D	4	3	1	0	3
E	9	5	8	9	5

- 15) a) Compare between assignment problem and transportation problem.  
b) Difference between PERT and CPM.

4

4



- 16) a) Explain the following Fairgame, Strategy. 2  
b) Solve the game whose pay off matrix is given by 6

		Player B		
		B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>
Player A	A <sub>1</sub>	1	3	1
	A <sub>2</sub>	0	-4	-3
	A <sub>3</sub>	1	5	-1

- 17) a) Write the general rule of dominance property. 4  
b) Use the Dominance principle to solve the following game. 4

		B		
		I	II	III
A	I	1	7	2
	II	6	2	7
	III	6	1	6

- 18) A project consists of the following activities and time estimates. 8

Activity	Least Time	Greatest Time	Most Likely Time
1 – 2	3	15	6
2 – 3	2	14	5
1 – 4	6	30	12
2 – 5	2	8	5
2 – 6	5	17	11
3 – 6	3	15	6
4 – 7	3	27	9
5 – 7	1	7	4
6 – 7	2	8	5