

QP CODE: 25020211



Reg No : .....

Name : .....

**B.Sc DEGREE (CBCS) ) REGULAR/ IMPROVEMENT/ REAPPEARANCE / MERCY  
CHANCE EXAMINATIONS, FEBRUARY 2025**

**Fourth Semester**

B.Sc Computer Science Model III

**Core Course - CC4CRT03 - COMPUTER AIDED OPTIMIZATION TECHNIQUES**

2017 Admission Onwards

B7EF8DE2

Time: 3 Hours

Max. Marks : 80

**Part A**

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Explain the nature of OR.
2. What are the components of an LPP?
3. Write the standard form of LPP.
4. Explain the concept of duality.
5. What are the limitations of LPP?
6. How to reduce row and column in an assignment problem?
7. What do you mean by an unbalanced Assignment problem and how can we convert an unbalanced AP into a balanced AP?
8. How to convert a maximization transportation problem into minimization?
9. What is a sequencing problem?
10. Write the general form of an LPP.
11. What is earliest occurrence time and latest occurrence time of an event?
12. What is the critical path?

(10×2=20)

**Part B**

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Solve the linear programming problem  
Maximize  $Z = 2x + 3y$   
 $x + y \leq 30$ ,





$$x \leq 20,$$

$$y \leq 12$$

$$x, y \geq 0$$

14. Explain the difference between slack and surplus variables.

15. Write the dual of the following.

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

$$\text{Subject to, } x_1 + x_2 \leq 10$$

$$3x_1 + x_2 + x_3 \geq 23$$

$$7x_1 - x_2 = 6$$

$$x_1, x_2, x_3 \geq 0$$

16. Explain Transportation problem.

17. Obtain an initial solution by the north west corner method

	A	B	C	D	SUPPLY
1	14	25	45	50	100
2	65	25	35	55	200
3	35	30	65	15	50
DEMAND	160	100	130	60	

18. There are five jobs each of which must go through the two machines A and B in the order AB. Processing times are given below:

Job	1	2	3	4	5
Machine A	4	1	9	3	10
Machine B	2	6	7	8	3

Determine a sequence for 5 jobs that will minimize the total elapsed time. Also find the idle time of each machines.

19. Draw a network for the project whose activities and their precedence relationships are given below.

Activity	A	B	C	D	E	F
Predecessor	-	A	-	B,C	C	D,E

20. Define float and briefly explain different types of floats used in network.

21. What are the advantages of PERT and CPM?

(6×5=30)





### Part C

Answer any **two** questions.

Each question carries **15** marks.

22. Five jobs are required to be processed on three machines A, B and C in the order, ABC. Processing times are given below. Determine an optimal sequence and evaluate the total elapsed time. Also find the idle time of each machine.

Job	1	2	3	4	5
M/C A	5	7	6	9	5
M/C B	2	1	4	5	3
M/C C	3	7	5	6	7

23. Solve the following LPP using simplex method.

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

Subject to,

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

$$2x_1 + 5x_3 \leq 10$$

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

$$x_1, x_2, x_3 \geq 0$$

24. A timber company ships pine flooring to three building supply houses from its mills in bhunya,mondi and pigg's peak.

Determine the best transportation schedule for the data given below

	HOUSE 1	HOUSE 2	HOUSE 3	CAPACITY(TONS)
BHUNYA	3	3	2	25
MONDI	4	2	3	40
PIGG'S PEAK	3	2	3	30
DEMAND(TONS)	30	30	35	95

25. Six jobs are required to be processed on three machines A, B and C in the order, ABC. Processing times are given below. Determine an optimal sequence and evaluate the total elapsed time. Also find the idle time of each machine.

Job	1	2	3	4	5	6
M/C A	3	12	5	2	9	11
M/C B	8	6	4	6	3	1
M/C C	13	14	9	12	8	13

(2×15=30)

