

QP CODE: 20101022



Reg No :

Name :

BSc DEGREE (CBCS) EXAMINATION , MARCH 2020

Fourth Semester

B.Sc Computer Science Model III

Core Course - CC4CRT03 - COMPUTER AIDED OPTIMIZATION TECHNIQUES

2017 ADMISSION ONWARDS

7FA27D7A

Time: 3 Hours

Marks: 80

Part A

*Answer any **ten** questions.*

Each question carries 2 marks.

1. Differentiate between static and dynamic models.
2. What are the components of an LPP?
3. Write the standard form of LPP.
4. What are the limitations of LPP?
5. What is the objective of transportation problem?
6. If the demand is not equal to the supply, then what is the solution?
7. What is prohibited assignment problem?
8. What are the principal assumptions made while dealing with sequencing problems?
9. What do you mean by maintenance crew scheduling?
10. What is network analysis? Which are the different network techniques?
11. Define max flow- mini cut.
12. What is earliest occurrence time and latest occurrence time of an event?

(10×2=20)

Part B

*Answer any **six** questions.*

Each question carries 5 marks.

13. Explain the nature of OR and its limitations.





14. Solve graphically, Minimize $Z = -x_1 + 2x_2$

Subject to,

$$-x_1 + 3x_2 \leq 10$$

$$x_1 + x_2 \leq 6$$

$$x_1 - x_2 \leq 2$$

$$x_1, x_2 \geq 0$$

15. Write the dual of the following.

$$\text{Minimize } Z = 2x_1 + 5x_3$$

$$\text{Subject to, } x_1 + x_2 \geq 2$$

$$2x_1 + x_2 + 6x_3 \leq 6$$

$$x_1 - x_2 + 3x_3 = 4$$

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

16. Calculate the prohibited assignment problem

item	A	B	C	D	E	F
A	-	11	15	16	9	9
B	11	-	10	15	14	10
C	15	10	-	8	13	9
D	16	15	8	-	11	10
E	9	14	13	11	-	6
F	9	10	9	10	6	-

17. Calculate the assignment problem

	E	F	G	H
A	8	10	4	11
B	2	12	35	30
C	23	42	15	2
D	9	18	20	3

18. Explain Shortest Route Problem.

19. Find the sequence that minimizes the total elapsed time in hours required to complete the following jobs on machines M1 and M2 in the order M1M2:

Job	A	B	C	D	E	F
Machine A	4	8	3	6	7	5
Machine B	6	3	7	2	8	4

20. Solve graphically,

$$\text{Maximize } Z = 8X_1 + 6X_2$$

Subject to,

$$4X_1 + X_2 \leq 60$$

$$2X_1 + 4X_2 \leq 48$$

$$X_1, x_2 \geq 0$$





21. 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 A, C B, C

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **15** marks.

22. Explain about the applications of OR ?

23. Apply principle of duality to solve the LPP.

Minimize $Z=2x_1 + 2x_2$

Subject to,

$$2x_1 + 4x_2 \geq 1$$

$$x_1 + 2x_2 \geq 1 \quad 2x_1 + x_2 \geq 1$$

$$x_1, x_2 \geq 0$$

Minimize $Z= x_1 + x_2 + x_3$

Subject to,

$$9x_1 + 5x_2 \geq 1$$

$$x_1 + 6x_2 + 2x_3 \geq 1$$

$$4x_1 + 3x_2 + 8x_3 \geq 1$$

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

24. Consider the following.

factories	Retail shops				Supply
	1	2	3	4	
1	3	5	7	6	50
2	2	5	8	2	75
3	3	6	9	2	25
	Demand	20	20	50	60

Find the initial basic feasible solution using North West corner method.

25. A project has the following characteristic

Activity	duration		
	Optimistic	most likely	pessimistic
1-2	1	5	1.5
2-3	1	3	2
2-4	1	5	3
3-5	3	5	4
4-5	2	4	3
4-6	3	7	5





5-7	4	6	5
6-7	6	8	7
7-8	2	6	4
7-9	5	8	6
8-10	1	3	2
9-10	3	7	5

Construct a PERT network. Find critical path and variance for each activity. What is the probability that the project will be completed a) Within 35 days b) Within 28 days. Find the project duration at 95% probability.

(2×15=30)

