TB206280W **Reg. No :.....**

Name :.....

B. Sc. DEGREE (C.B.C.S.) EXAMINATION, MARCH 2023

(2020 Admission Regular, 2019, 2018 Admissions Supplementary)

SEMESTER VI - CORE COURSE (STATISICS)

(For Computer Applications)

ST6B07B18 - OPTIMIZATION TECHNIQUES

Time : 3 Hours **Maximum Marks : 80**

Part A

I. Answer any Ten questions. Each question carries 2 marks **(10x2=20)**

1. What is an Analogue model?
2. Mention different phases in an operation research study
3. Give an example for mathematical model
4. Explain linear programing
5. Define surplus variable
6. State Assignment Problem.
7. Which method is more accurate to find an initial feasible solution for a Transportation Problem?
8. Define the dual linear programming
9. Who Developed Critical Path Method?
10. Explain EVENT in PERT/CPM network
11. Write the full form of PERT
12. What are the basic assumptions underlying the “expected time “estimate?

Part B

II. Answer any Six questions. Each question carries 5 marks **(6x5=30)**

13. Mention in detail the different phases in an operation research study
14. Explain Models and modelling in Operations Research
15. Explain the graphical method of solving Linear Programing Problem
16. A manufacturer produces 2 different models X and Y , of the same product. Model X makes a contribution of Rs 50 per unit , and model Rs 30 per unit towards total profit. Raw materials r_1, r_2 are required for production. At least 18 kg of r_1, and 12kg of r_2 must be used daily. Also atmost 34 hours of labour are to be utilized. A quantity of 2 kg of r_1, is needed for model X and 1kg of r_1 needed for model Y .

    For each of X and Y 1kg of *r2* is required. It takes 3 hrs to manufacture model X and 2 hrs to manufacture Y . How many units of each models should be produced to maximize the profit? Use graphical method to solve the problem.

17. Use the Graphical method to solve the following Linear Programing

    Maximize $Z=15x_1+10x_2$

    Subject to constrains $4x_1+6x_2 \leq 360$

    $3x_1+0x_2 \leq 180$

    $0x_1+5x_2 \leq 200$

$x_1, x_2 \geq 0$

18. Show that transportation problem is a special type of LP
19. Using Least Cost Method solve the following Transportation Problem by using the Least Cost Method

	D1	D2	D3	D4	Supply
S1	1	2	1	4	30
S2	3	3	2	1	50
S3	4	2	5	9	20
Demand	20	40	30	10	

20. Why does Vogel's approximation method Provide a good feasible solution ?
21. What are the major limitations of a PERT model?

Part C

III. Answer any Two questions. Each question carries 15 marks **(2x15=30)**

22. Use Simplex Method to solve the following LPP

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

    Subject to constrains $2x_1+3x_2 \leq 8$

    $2x_2+5x_3 \leq 10$

    $3x_1+2x_2+4x_3 \leq 15$

    $x_1, x_2, \boldsymbol{x_3} \geq 0$

23. Give the flow chart of steps in the Hungarian problem
24. What is a Transportation Problem. Explain the three methods of obtaining initial feasible solution?
25. An assembly is to be made from two parts X and Y. Both parts must be turned on a lathe and Y must be polished whereas X need not be polished. The sequence of activities together with their predecessors is given below.

Activity	Description	Predecessor Activity
A	Open work order	.....
B	Get material for X	A
C	Get material for Y	A
D	Turn X on lathe	B
E	Turn Y on lathe	B,C
F	polish Y	E
G	Assemble X and Y	D,F
H	Pack	G