QP CODE: 25020350

25020350

Reg No : .....

Name : .....

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

Sixth Semester

B.Sc Statistics Model I

CHOICE BASED CORE COURSE - ST6CBT01 - OPERATIONS RESEARCH

2017 Admission Onwards

340F0D49

Time: 3 Hours Max. Marks : 80

Part A

*Answer any **ten** questions.*

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

1. State the assumptions underlying in LPP.
2. What is meant by formulation of a linear programming problem?
3. What do you mean by basic solution to the system of equations AX=b?
4. What is meant by Big M method?
5. What do you mean by auxiliary LPP in two-phase method?
6. What have you understood about degeneracy in linear programming problems?
7. What is meant by penalties in Vogel's approximation method?
8. Give an example of an assignment problem.
9. How many assignments are possible in an assignment problem involving four workers and three jobs? Explain.
10. What do you understand by network diagram?
11. Explain concurrent activities.
12. Define normal time in connection with PERT.

(10×2=20)

Part B

*Answer any **six** questions.*

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

13. What is operations research? Account for the growing importance of OR in business decisions.

14. Discuss various classification schemes of OR models.

15. What do you mean by unrestricted variables? Illustrate with an example.

16. What is meant by artificial variables? Explain its role in simplex algorithm.

17. Prove that the dual of the dual of a given primal is again primal.

18. How do you find out initial basic feasible solution for a transportation problem using North-West corner rule?

19. Explain the least-cost method.

20. Which are various type errors that are possible while drawing network diagrams?

21. Explain (i) total float (ii) free float and (iii) independent float.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. Explain the Simplex procedure to solve a linear programming problem.

23. For the L.P.P

Minimize $Z = 2x_1 + 2x_2$

Subject to

$$2x_1 + 4x_2 \geq 1$$
$$x_1 + 2x_2 \geq 1$$
$$2x_1 + x_2 \geq 1$$
$$x_1 \geq 0, x_2 \geq 0$$

(i)Write down the dual (ii) solve the dual using the Simplex method and (iii) obtain the optimum solution of the primal from the solution of the dual.

24. A company has factories at F_1, F_2 and F_3 which supply warehouses at W_1, W_2 and W_3. Weekly factory capacities are 200,160, and 90 units respectively. Weekly warehouses requirements are 180,120 and 150 respectively. Unit shipping costs (in rupees) are as follows:

Factory	*Warehouse*			Supply
	W_1	W_2	W_3	
F_1	*16*	*20*	*12*	***200***
F_2	*14*	*8*	*18*	***160***
F_3	*26*	*24*	*16*	***90***
Demand	***180***	***120***	***150***	***450***

Determine the optimum distribution for this company to minimize total shipping cost.

25. *The following are the details of estimated times of activities of a certain project:*

Activity	Immediate predecessors	Estimated time (weeks)
A	---	*2*
B	*A*	*3*
C	*A*	*4*
D	*B,C*	*6*
E	---	*2*
F	*E*	*8*

a. *Find the critical path and the expected time of the project.*

b. *Calculate the earliest start time and earliest finish time for each activity.*

c. *Calculate the slack for each activity.*

(2×15=30)