



K19U2279

Reg. No. :

Name :

V Semester B.Sc. Degree (CBCSS- Reg./Sup./Imp.) Examination,
November-2019

(2014 Admn. Onwards)

Core Course in Statistics

5B 09 STA: Statistical Quality Control and Operations Research

(Use of calculators and Statistical tables are permitted)

Time : 3 Hours

Max. Marks : 48

PART - A (Short answer)

Answer **all** the **6** questions.

(6×1=6)

1. What is the difference between feasible solution and basic feasible solution?
2. What are the slack and surplus variables?
3. What do you mean by quality of a product?
4. Define Consumer's risk.
5. What are rational subgroups?
6. Define AOQL.

PART - B (Short essay)

Answer any **7** questions.

(7×2=14)

7. Define
 - i) Optimum solution and
 - ii) Degenerate basic feasible solution

P.T.O.



8. Write the mathematical form of a primal problem and its corresponding dual problem.
9. Distinguish between transportation problem and assignment problem.
10. Explain North West Corner rule of solving a transportation problem.
11. Write a short note on modified control chart.
12. Distinguish between process control and product control.
13. Describe 3σ control limits.
14. Explain double sampling plan.
15. Define
 - i) LTPD and
 - ii) AQL

PART - C (Essay)

Answer any 4 questions.

(4×4=16)

16. Explain the simplex method of solving an LPP.
17. Solve graphically the following LPP and comment on the result.

Maximize $z = 3x_1 + 2x_2$

Subject to $3x_1 + 2x_2 \leq 120,$

$x_1 + x_2 \leq 50,$

$x_1 \leq 30,$

$x_1, x_2 \geq 0.$

18. Explain the Hungarian method of solving an assignment problem.
19. Distinguish between defect and defective. How do you calculate control limits for a C chart?

P.T.O.



20. Write a short notes on:
 - i) np chart
 - ii) AOQ
21. Explain the method of constructing R chart.

PART - D (Long essay)

Answer any 2 questions.

(2×6=12)

22. Using simplex method, solve the following LPP.

Maximize $z = 15x_1 + 6x_2 + 9x_3 + 2x_4$

Subject to the

constraints $2x_1 + x_2 + 5x_3 + 6x_4 \leq 20,$

$3x_1 + x_2 + 3x_3 + 25x_4 \leq 24,$

$7x_1 + x_4 \leq 70,$

$x_1, x_2, x_3, x_4 \geq 0.$

23. Find the optimum basic feasible solution for the following transportation problem.

Source/Destination	D1	D2	D3	Supply
S1	2	7	4	5
S2	3	3	1	8
S3	5	4	7	7
S4	1	6	2	14
Demand	7	9	18	34

24. Explain the construction and interpretation of control chart for fraction defective.
25. Describe single sampling plan. Find the expression for OC curve in single sampling plan.