



Reg. No. :

Name :

V Semester B.Sc. Degree (CBCSS – Supplementary)
Examination, November 2023
(2017 and 2018 Admissions)
CORE COURSE IN STATISTICS
5B09STA : Statistical Quality Control and Operations Research

Time : 3 Hours

Max. Marks : 48

PART – A
(Short Answer)

Answer **all** questions, **each** question carries **one** mark.

1. Define objective function and decision variable of LPP.
2. What is the difference between slack variable and surplus variable ?
3. Define unrestricted variable.
4. Distinguish between defective and defects.
5. Define tolerance limit.
6. Write the control limits for np (or d) chart when standards are given. (6×1=6)

PART – B
(Short Essay)

Answer **any 7** questions, **each** question carries **two** marks.

7. Write the procedure for the mathematical formulation of LPP.
8. Prove that the set of feasible solutions to a LPP is a convex set.
9. Define canonical form of LPP.

P.T.O.

K23U 2849

-2-



10. What is the difference between balanced and unbalanced transportation problem ? How we convert an unbalanced transportation problem into balanced transportation problem ?
11. Write the mathematical form of assignment problem.
12. Define process control and product control.
13. Explain the control chart for variables.
14. What do you mean by consumers risk ?
15. Explain LTPD. (7×2=14)

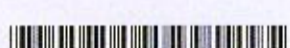
PART – C
(Essay)

Answer **any 4** questions, **each** question carries **4** marks.

16. Solve the following LPP by graphical method.
 Min $Z = 20x + 40y$
 Subject to the constraints $36x + 6y \geq 108$
 $3x + 12y \geq 36$
 $20x + 10y \geq 100$
 $x, y \geq 0$
17. Using an example show that dual of the dual is primal.
18. Find the initial basic feasible solution of the following transportation problem using Vogels approximation method.

	P	Q	R	S	Availability
A	7	2	5	5	30
B	4	4	6	5	15
C	5	3	3	2	10
D	4	-1	4	2	20
Requirement	20	25	15	15	

19. Explain chance causes and assignable causes.
20. Explain ASN and ATI.
21. Write the steps for constructing control limit for mean chart. (4×4=16)



-3-

K23U 2849

PART – D
(Long Essay)

Answer **any 2** questions, **each** question carries **6** marks.

22. Solve the following LPP by simplex method.
 Max $Z = 5x + 2y$
 Subject to the constraints $4x + 3y \leq 12$
 $2x - y \leq 4$
 $x, y \geq 0$

23. Solve the following assignment problem

	1	2	3	4
A	30	27	31	39
B	28	18	28	37
C	33	17	29	41
D	27	18	30	43
E	40	20	27	36

24. Find the control limit for mean and SD for the given data and verify.

Sample 1	2.3	2.2	2.4	2.3
Sample 2	2.1	2.2	2.3	2.4
Sample 3	2	2.1	2.2	2.1
Sample 4	2	2.2	2.1	2.3
Sample 5	2.5	2.1	2.4	2.3

25. Explain the difference between single sampling plan and double sampling plan. State the merits of DSP over SSP. (2×6=12)