STATISTICS

K22U 1990

Reg. No. : .....

Name : .....

V Semester B.Sc. Degree (CBCSS – Supplementary) Examination, November 2022

(2016 – 18 Admissions)

CORE COURSE IN STATISTICS

5B09STA : Statistical Quality Control and Operations Research

Time : 3 Hours Max. Marks : 48

PART – A

(Short Answers)

Answer **all** the **6** questions. **(6×1=6)**

1. What do you mean by control limits ?
2. Define consumer's risk.
3. What is OC curve ?
4. What is meant by a convex hull ?
5. What are artificial variable ?
6. Define feasible solution.

PART – B

(Short Essay)

Answer **any 7** questions. **(7×2=14)**

7. Explain control chart for attributes.
8. Explain what you understand by process control. How is it achieved ?
9. Distinguish between p chart and np chart.
10. Obtain the control limits of C chart.

P.T.O.

11. What is basic solution ?
12. State the fundamental theorem of duality.
13. Write down the mathematical model of an assignment problem.
14. Write the standard form of LPP.
15. Solve the problem graphically.

Maximize $Z = 5x_1 + 3x_2$

Subject to $5x_1 + 2x_2 \leq 10$

$3x_1 + 5x_2 \geq 15$

$x_1, x_2 \geq 0$

PART – C

(Essay)

Answer **any 4** questions. **(4×4=16)**

16. Explain the construction of the control chart for no of defectives.
17. Explain the terms chance causes and assignable causes.
18. Prepare $\bar{X}$ chart using the following and comment on the state of control.

Sample No.	1	2	3	4	5
Average	2.6	2.7	2.7	2.4	2.8
Range	0.2	0.2	0.3	0.4	0.3

19. Define dual of an LPP. With the help of an example, show that dual of dual is primal.
20. What is an transportation problem ? Represent a transportation problem as an LPP.

PART – D

(Long Essay)

Answer **any 2** questions. **(2×6=12)**

21. Solve by simplex method.

Maximize $Z = 2x_1 + x_2$

Subject to $x_1 + 2x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

$x_1 - 2x_2 \leq 1$

$x_1, x_2 \geq 0$

22. Four different jobs can be done on four different machines. The matrix below gives the cost in rupees of producing job i on Machine j.

	M_1	M_2	M_3	M_4
J_1	5	7	11	6
J_2	8	5	9	6
J_3	4	7	10	7
J_4	10	4	8	3

How should the jobs be assigned to the various machines in order to minimize the total cost involved ?

23. Draw suitable control chart for the following data of number of defective threads in 15 pieces of cloth in a certain number of synthetic fibres and state your conclusions.

7, 12, 3, 20, 21, 5, 4, 3, 10, 8, 0, 9, 6, 7, 20.

24. Explain the main control charts for variables and obtain their control limits.

———