



Reg. No. :

Name :

V Semester B.Sc. Degree (CBCSS – Reg./Sup./Imp.)
 Examination, November 2020
 (2014 Admn. Onwards)

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 Statistical Quality Control ?
2. What is control chart ?
3. Define producer's risk.
4. What do you mean by OC curve ?
5. Define hyper plane.
6. Define feasible solution.

PART – B
 (Short Essay)

Answer any 7 questions.

(7×2=14)

7. Explain control chart for variables.
8. What do you mean by quality of a lot ?
9. Explain chance causes of variation in quality control.
10. Distinguish between control chart for variables and control chart for attributes.



11. Explain acceptance sampling.
12. Explain graphic method of solving an LPP.
13. What is the purpose of slack and surplus variables in simplex procedure ?
14. Write down the procedure of two phase method for solving an LPP.
15. Construct the dual of the problem :

$$\text{Maximize } Z = 3x_1 + 5x_2$$

$$\text{Subject to } 2x_1 + 6x_2 \leq 50$$

$$3x_1 + 2x_2 \leq 35$$

$$5x_1 - 3x_2 \leq 10$$

$$x_2 \leq 20$$

$$x_1, x_2 \geq 0$$

**PART – C
(Essay)**

Answer **any 4** questions.

(4×4=16)

16. What are the uses of statistical quality control ?
17. Explain the terms chance causes and assignable causes.
18. An inspection of 10 samples of size 400 each from 10 lots revealed the following number of defective unit :
17, 15, 14, 26, 9, 4, 19, 12, 9, 15
Obtain the control chart for number of defective units and state whether the process is under control or not.
19. What is an assignment problem ? Represent an assignment problem as an LPP.
20. State and prove maximin theorem of LPP.
21. Explain double sampling plan.



**PART – D
(Long Essay)**

Answer **any 2** questions.

(2×6=12)

22. Explain the procedure of simplex algorithm for solving a linear programming problem.
23. Four different job can be done on four different machines. The matrix below gives the cost in rupees of producing job i on Machine j 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	15	13	14	17
J ₂	11	12	15	13
J ₃	13	12	10	11
J ₄	15	17	14	16

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

24. Explain the steps involved in the construction of control chart for mean and range. How will you interpret these charts ?
25. A) What are the uses of C chart ?
B) Ten pieces of cloth out of different rolls of equal length contained the following number of defects 3, 0, 2, 8, 4, 2, 1, 3, 7, 1. Prepare a C chart and state whether the process is in a state of statistical control.