



M 9829

Reg. No.:

Name:

V Semester B.Sc. Degree (CCSS – Reg./Supple./Imp.)
Examination, November 2015
CORE COURSE IN STATISTICS
5B09 STA : Statistical Quality Control and Operations Research

Time : 3 Hours

Max. Weightage : 30

PART – A

Answer **any 10** questions. Weightage **1 each**.

1. Define basic feasible solution.
2. What is the basis of control charts ?
3. Define Producer's risk.
4. What are the assumptions of LPP ?
5. What is the meaning of SQC ? Explain.
6. Define AQC.
7. What are the control limits of \bar{X} and \bar{R} chart ?
8. What is degeneracy in LPP ?
9. Write down the dual of the following LPP

Maximise $Z = 3X_1 + X_2 + 4X_3$ such that

$$X_1 + 2X_2 - X_3 \leq 150$$

$$3X_1 + 2X_3 \leq 260$$

$$X_1 - 4X_2 \leq 120 \quad X_1, X_2, X_3 \geq 0.$$

10. Distinguish between primal and dual of a LPP.
11. What is meant by quality of a product ?

(10×1 = 10)

P.T.O.



PART – B

Answer **any 6** questions. Weightage **2 each**.

12. Explain the concept of acceptance sampling.
13. Distinguish between chance causes and assignable causes. What are the measures used to control them ?
14. Explain double sampling plan.
15. What are natural tolerance limits and specification limits ? Compare them.
16. Explain the terms :
 - a) AOQ and
 - b) LIPD
17. State the advantages and limitations of statistical quality control.
18. What is the significance of duality theory of linear programming ? Describe the general rules for writing the dual of a LPP.
19. Solve the following LPP

Maximise $Z = x_1 + \frac{1}{2}x_2$ such that

$$3x_1 + 2x_2 \leq 12$$

$$5x_1 \leq 10$$

$$x_1 + x_2 \geq 8$$

$$-x_1 + x_2 \geq 4 \text{ and } x_1, x_2 \geq 0.$$

20. What is Hungarian algorithm for the solution of the transportation problem ? (6×2 = 12)

PART – C

Answer **any 2** questions. Weightage **4 each**.

21. a) What do you understand by acceptance sampling plan ?

b) Given

Factory	Warehouse				Capacity
	D	E	F	G	
A	42	48	38	37	160
B	40	49	52	51	150
C	39	38	40	49	190
Demand	80	90	110	100	

Find an optimum solution to the above transportation problem.



22. Explain the construction and working of \bar{X} and R chart.
 23. Discuss single sampling plan (n, c). Obtain the values of n and c by
 - a) Lot quality protection and
 - b) Average quality protection.
 24. What is simplex method in LPP. And explain the simplex algorithm to solve a LPP. **(2×4 = 8)**
-