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Reg. No. :

Name :

V Semester B.A./B.Sc./B.Com./B.B.A./B.B.A.T.T.M./B.B.M./B.C.A./B.S.W./
B.A. Afsal UI Ulama Degree (CCSS – Reg./Supple./Improv.)

Examination, November 2012

CORE COURSE IN STATISTICS

5B09 STA: Statistical Quality Control and Operations Research

Time: 3 Hours

Max. Weightage : 30

Instruction : Use of calculators and statistical tables are permitted.

PART – A (Weightage 1 each)

Answer **any ten** questions.

1. What is meant by statistical quality control ?
2. State the causes producing variation in the quality of a product.
3. What are the advantages of process control ?
4. Define logic of drawing 3 sigma tenets.
5. Define consumer's risk.
6. Define slack and surplus variables.
7. What are the components of a linear programming problem ?
8. What is meant by infeasible linear programming problem ?
9. What are unbalanced transportation problems ?
10. What is degeneracy in transportation problem ?
11. Define :Assignment problems.

(10×1=10)

P.T.O.



PART – B

(Weightage 2 each)

Answer **any six** questions :

12. Explain the construction of control charts.
13. Distinguish between control chart for variables and chart for attributes.
14. Discuss single sampling plan.
15. What are the assumptions used in linear programming.
16. Explain the concept of duality in linear programming.
17. Show that transportation problem is a special case of linear programming problem.
18. Using the following primal problem prove that “dual of the dual in primal”
 Minimise $Z = 4x_1 + 2x_2 + x_3$
 Subject to $x_1 + x_2 \leq 10$, $3x_1 + x_2 + x_3 \geq 23$
 $7x_1 - x_3 \geq 6$ and $x_1, x_2, x_3 \geq 0$.
19. Discuss the Hungarian method of solving assignment problems.
20. Obtain initial basic solution to the following transportation problem by North West Corner rule.

Market \ Plant	W_1	W_2	W_3	W_4	Availability
F_1	11	20	7	8	50
F_2	21	16	10	12	40
F_3	8	12	18	9	70
Requirement	30	25	35	40	(6×2=12)

PART – C

(Weightage 4 each)

Answer **any two** questions.

21. Explain need and utility of statistical quality control in industry.
22. Explain double sampling plan.



23. Ten samples of size 5 each are drawn at regular intervals from a manufacturing process. The sample means and range are given below :

Sample Number :	1	2	3	4	5	6	7	8	9	10
Sample Mean :	49	45	48	53	39	47	46	39	51	45
Sample Range :	7	5	7	9	5	8	8	6	7	6

Construct chart for mean and range. Comment on the control of the process.

24. Solve by simplex method

Minimise $Z = 3x_1 + 8x_2$

Subject to $x_1 + x_2 = 200$

$x_1 \leq 80$

and $x_2 \geq 60$

$x_1, x_2, \geq 0.$

(2x4=8)