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B.E/B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2011

INFORMATION TECHNOLOGY

Sixth Semester

Regulations 2008

MA9267 STATISTICS AND LINEAR PROGRAMMING

Instructions: 1. Answer all the questions

2. Use of statistical table & Calculator is permitted

Time: 3 hr

Maximum Marks 100

Part A (10 x 2 = 20 Marks)

1. Briefly explain the various uses of chi-square test.
2. Explain the following terms:
  - (i) Type I and II Errors
  - (ii) Critical and Acceptance Regions
3. State the model equation for a completely randomized design.
4. State the distinguishing features of a factorial experiment.
5. If  $\alpha = 0.05$ , AQL=0.9,  $\beta=0.10$  and LPTD=7.8, design a sampling plan that will satisfy producers stipulation completely and come closer to consumers stipulation.
6. Distinguish between process control and product control.
7. Differentiate between feasible solution and optimum solution of LPP.
8. What is an unbalanced transportation problem?
9. Write the dual of the following LPP.  
Maximize  $Z=45x_1+80x_2$   
Subject to:  $5x_1+20x_2\leq 400$   
 $10x_1+15x_2\leq 450$   
 $x_1, x_2 \geq 0$
10. Write some practical applications of integer programming problem.

Part B (5 x 16 = 80 Marks)

11. Solve the following problem by simplex method

$$\begin{aligned} \text{Maximize } & Z = x_1 - 3x_2 + 2x_3 \\ & 3x_1 - x_2 + 3x_3 \leq 7 \\ \text{Subject to } & -2x_1 + 4x_2 \leq 12 \\ & -4x_1 + 3x_2 + 5x_3 \leq 10 \\ & x_1, x_2, x_3 \geq 0 \end{aligned}$$

(Or)

- b.i. The number of customer complaints received daily by an organization is given below:

Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Complaints:	2	3	0	1	9	2	0	0	4	2	0	7	0	2	4

Does it mean that the number of complaints is under statistical control? Establish a control scheme for the future.

- ii. A machine is set to deliver packets of a given weight. Ten samples of size five each were examined and the following results were obtained:

Sample:	1	2	3	4	5	6	7	8	9	10
Mean:	15	17	15	18	17	14	18	15	17	5
Range:	7	7	4	9	8	7	12	4	11	5

Calculate the values for the central line and the control limits for the mean chart and range chart. Comment on the state of control.

- 15a. Solve the following problem

$$\begin{aligned} \text{Maximize} \quad & Z = -4x_1 + 5x_2 \\ \text{Subject to} \quad & -3x_1 + 3x_2 \leq 6 \\ & 2x_1 + 4x_2 \leq 12 \\ & x_1, x_2 \text{ are non-negative integers} \end{aligned}$$

(Or)

- b. Use dual simplex method to solve the following problem

$$\begin{aligned} \text{Minimize} \quad & Z = x_1 + x_2 \\ \text{Subject to} \quad & 2x_1 + x_2 \geq 2 \\ & -x_1 - x_2 \geq 1 \\ & x_1, x_2 \geq 0 \end{aligned}$$

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