

28/9/13

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B.TECH. (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

INFORMATION TECHNOLOGY

Sixth Semester

MA 9267 - Statistics and linear programming

(Regulation 2008)

(Use of Statistical table may be permitted)

Time: 3 Hours

Answer ALL Questions

Max. Marks:100

Part A

(10 × 2 = 20)

1. What are all the advantages of Non-parametric tests?
2. Define Type I and Type II Error.
3. Define Latin Square design.
4. What is the aim of design of experiment?
5. Define process control and product control.
6. Explain tolerance limits.
7. Solve the linear programming problem by graphical method, $Max z = 6x_1 + 4x_2$, subject to the constraints $x_1 + x_2 \leq 5$, $x_2 \geq 8$, $x_1, x_2 \geq 0$.
8. Explain how the maximization transportation problem can be converted to an equivalent cost minimization transportation problem?
9. Construct the dual of the problem
 $Minimize z = 4x_1 + 3x_2 + 3x_3$
 Subject to the constraints $2x_1 + 2x_2 \geq 2, 3x_1 + x_2 + x_3 \geq 4$, $4x_3 \geq 1$, $x_1 + x_3 \geq 1$ and $x_1, x_2, x_3 \geq 0$.
10. Why integer programming used instead of rounding off the optimum values in linear programming problem?

Part B

(5 × 16 = 80)

11. (i) The mean yield of wheat from a district A was 210 pounds with standard deviation 10 pounds per acre from a sample of 100 plots. In another district B, the mean yield was 220 pounds with standard deviation 12 pounds from a sample of 150 plots. Assuming that the standard deviation of yield in the entire state was 11 pounds, test whether there is any significant difference between the mean yield of crops in the two districts. (8)

- (ii) Given the following contingency table for hair colour and eye colour. Find the value of ψ^2 . Is there good association between the two? (8)

		Hair Colour			Total
		Fair	Brown	Black	
Eye Colour	Blue	15	5	20	40
	Grey	20	10	20	50
	Brown	25	15	20	60
	Total	60	30	60	150

12. (a) The following data represent the number of units of production per day turned out by 5 different workers using 4 different types of machines:

		Machine Type			
		A	B	C	D
workers	1	44	38	47	36
	2	46	40	52	43
	3	34	36	44	32
	4	43	38	46	33
	5	38	42	49	39

- (1) Test whether the five men differ with respect to mean productivity.
 (2) Test whether the mean productivity is the same for the four different machine types. (16)

(OR)

- (b) A completely randomized design experiment with 10 plots and 3 treatments gave the following results: (16)

Plot No.	1	2	3	4	5	6	7	8	9	10
Treatment	A	B	C	A	C	C	A	B	A	B
Yield	5	4	3	7	5	1	3	4	1	7

Analyze the results for treatment effects.

13. (a) The data given below are the number of defectives in 10 samples of 100 items each. Construct a p-chart and an np-chart and comment on the results. (16)

Sample number	1	2	3	4	5	6	7	8	9	10
No. of defectives	6	16	7	3	8	12	7	11	11	4

(OR)

- (b) (i) The following data gives the number of defects found in 30 pieces of cotton goods inspected everyday in a month:

Defects : 1,3,8,2,1,10,0,16,1,12,5,8,9,3,6,8,14,2,7,1,4,6,20,19,5,1,6,1,7,1

Can you say that these data come from a controlled process? (12)

(ii) What are the advantages of control chart? (4)

14. (a) Solve the following transportation problem, (16)

	Destination				Supply
Source	6	1	9	3	70
	11	5	2	8	55
	10	12	4	7	70
Demand	85	35	50	45	

(OR)

- (b) (i) The processing time in hours for the jobs when allocated to the different machines are indicated below. Assign the machines for the jobs so that the total processing time is minimum. (8)

Machines

	M1	M2	M3	M4	M5
J1	21	16	25	13	13
J2	17	18	14	23	23
J3	32	27	18	41	41
J4	17	18	14	23	23
J5	32	27	18	41	41