

(Following Paper ID and Roll No. to be filled in your
Answer Books)

Paper ID :151662

Roll No.

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B.TECH.

Theory Examination (Semester-VI) 2015-16

STATISTICAL DESIGN OF EXPERIMENTS

Time : 3 Hours

Max. Marks : 100

**Note: Attempt all Sections. Assume suitable data, if required.
All questions carry equal marks.**

Section-A

1. Define the followings : (2×10=20)

- (a) Strategy of experimentation
- (b) Two factor factorial design
- (c) Chi-squared Test
- (d) Randomized blocks
- (e) Non-Linear regression
- (f) Sampling

- (g) Non parametric methods
- (h) F tests
- (i) Duality in linear programming
- (j) Simplex method

Section-B

2. Attempt any five questions from this section. (10×5=50)

- (a) Explain Latin squares and related design in detail.
- (b) Discuss the prediction of new response observations and regression model diagnostics.
- (c) Describe fundamental design and types of design of experiments.
- (d) Explain 2^2 and 2^3 fractional design and the general 2^k factorial design.
- (e) Explain control composite and Box-Behnken designs.
- (f) Describe the analysis of a second order response surface. What are the experimental designs for fitting response surfaces?

- (g) Describe the method of simultaneous optimization of several responses.
- (h) Give the solution of the following linear programming problem using revised simplex method
Max. $Z=2x_1+x_2+2x_3$, subject to $4x_1+3x_2+8x_3 \leq 12$, to $4x_1+x_2+12x_3 \leq 8$, $4x_1-x_2+3x_3 \leq 8$, and $x_1, x_2, x_3 \geq 0$

Section-C

Attempt any two parts of the following : (15×2=30)

3. (a) Define the term Variance and Co-variance. Explain the procedure of analysis of variance of mean with suitable examples.
- (b) Describe the analysis of fixed effects model and model adequacy analysis.
4. (a) Describe Linear regression models and explain the method of estimation of parameters in Linear regression models.
- (b) Describe the mixed level factorial and fractional factorial designs of experiments.
5. Explain Nested and split plot design. Also describe the non-normal responses and transformations.