Printed Pages: 02 **Sub Code: NCH012**

Paper Id: 151230 **Roll No.** | | | | | | | | | | |

B TECH

(SEM VI) THEORY EXAMINATION 2018-19

STATISTICAL DESIGN OF EXPERIMENTS

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a) Define distribution.
b) Explain the term 'Regression'.
c) Define 'Optimization'.
d) Define blocking.
e) What do you mean by logistic?
f) Define hypothesis.
g) What is diagnostics?
h) What do you mean by sample size?
i) What are latin squares?
j) Define variance.

SECTION B

2. Attempt any *three* of the following: **10x3=30**

a) Define the term 'Sampling'. Also discuss the basic 'concept of sampling distribution' with suitable example.
b) What do you mean by design experiments? Explain all types of the design experiments.
c) Explain the linear regression model with suitable example.
d) Explain the concept of randomized blocks with suitable example.
e) Explain the analysis of a second-order response surface.

SECTION C

3. Attempt any *one* part of the following: **10x1=10**

a) What are non-parametric methods? Explain.
b) Explain the basic principles and guidelines for designing experiments.

4. Attempt any *one* part of the following: **10x1=10**

a) Explain 'Steepest ascent method' with suitable examples.
b) Describe the term 'Non linear regression'. Also discuss the procedure for parameter estimation in linear regression model. Explain with suitable examples.

5. Attempt any *one* part of the following: **10x1=10**

a) Elaborate the fundamental of design of experiment. Also explain 'Randomized blocks' with suitable examples.
b) Explain 'Simplex method' with suitable examples.

6. Attempt any *one* part of the following: **10x1=10**

a) Explain 'Steepest ascent method' with suitable examples
b) Discuss the terms 'mean, variance and covariance'. Give the detail procedure of the analysis of variance and mean, with suitable mathematical example.

7. Attempt any *one* part of the following: **10x1=10**

a) Give the solution of the following Linear Programming Problem using simplex method :
Max. $Z = 3x_1 + 5x_2 + 4x_3$ Subject to $2x_1 + 3x_2 \leq 8$, $3x_1 + 2x_2 + 4x_3 \leq 15$, $2x_2 + 5x_3 \leq 10$ and $x_1, x_2, x_3 \geq 0$.
b) Explain the term 'Hypothesis'. Also discuss the method of hypothesis testing in multiple regressions, with suitable examples.