Sub Code: RCH054

Paper Id: 151504 Roll No: | | | | | | | | | | | | | |

B.TECH
(SEM V) THEORY EXAMINATION 2019-20
STATISTICAL DESIGN OF EXPERIMENTS

Time: 3 Hours *Total Marks: 70*

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a) Define Covariance.
b) What is sample size?
c) Define optimization.
d) What do you understand by concave?
e) Explain the term hypothesis.
f) What are non-parametric methods?
g) Define method of penality.

SECTION-B

2. Attempt any *three* of the following: 7 x 3 = 21

a) Define the term 'Sampling'. Also discuss the basic 'concept of sampling distribution' with suitable example
b) Discuss the basic principal and guidelines for designing experiments.
c) Explain the non linear regression model with suitable example.
d) Discuss the discontinuous fuction? How one can check the continuity of a function?
e) Find by the dichotomous search minimum of $y=4x^2 -2x+5$ subjected to $g= x^2 -4\leq 0$.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

a) Explain two factor factorial with random factors.
b) Explain 'Robust design' with suitable examples.

4. Attempt any *one* part of the following: 7 x 1 = 7

a) Explain the bisection method with an example.
b) Explain 2^2 and 2^3 factional design.

5. Attempt any *one* part of the following: 7 x 1 = 7

a) Explain the procedure of the analysis of variance and mean, with suitable example.
b) Give the solution of the following Linear Programming problem using simplex method :

Max. $Z = 4x_1 + 6x_2 + 7x_3$ Subject to $x_1 + 2x_2 \leq 6$, $2x_1 + 2x_2 + 3x_3 \leq 14$, $x_2 + 3x_3 \leq 11$ and $x_1, x_2, x_3 \geq 0$.

6. Attempt any *one* part of the following: 7 x 1 = 7

a) Use the Fibonacci method to obtain the maximum value of the function $y = 9x-0.1x^2$ in the range $0\leq x\leq 100$ with in an accuracy of 0.1 % of the original range. Calculate upto 5 interaction only.
b) Explain paired comparing design with suitable examples.

7. Attempt any *one* part of the following: 7 x 1 = 7

a) Define dynamic programming explain with suitable example.
b) How will you determine the sample size with random effects? Explain with suitable examples.