Printed Page:- Subject Code:- AMTME0102

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute)

Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow

M.Tech

SEM: I - THEORY EXAMINATION (2021 - 2022)

Subject: Design of Experiments

Time: 03:00 Hours Max. Marks: 70

General Instructions:

1. All questions are compulsory. It comprises three Sections A, B and C.

- Section A - Question No- 1 is objective type question carrying 1 mark each & Question No- 2 is very short type questions carrying 2 marks each.
- Section B - Question No- 3 is Long answer type - I questions carrying 4 marks each.
- Section C - Question No- 4 to 8 are Long answer type - II questions carrying 7 marks each.
- No sheet should be left blank. Any written material after a Blank sheet will not be evaluated/checked.

SECTION A 15

1. Attempt all parts:-

1-a. Which of these can be obtained by using the Experimental design? CO1 1

1. The traffic utilization ratio
2. Reduced process capability
3. Increased variability
4. Increased cost

1-b. In a factorial experiments, we... CO 2 1

1. test one factor at a time
2. cannot estimate interactions
3. test all possible combination of factor levels are tested
4. All of these

1-c. What must we include when reporting an ANOVA? CO3 1

1. Standard deviations AND Means
2. Standard deviations
3. Means
4. Degrees of freedom

1-d. In two-way ANOVA with m=5, n=4, then the total degrees of freedom is CO 4 1

1. 18
2. 20
3. 21
4. 19

1-e. Received Signal Strength Indicator (RSSI) is used to determine CO 4 1

1. The traffic utilization AND Location
2. The traffic utilization ratio
3. The information security system
4. The location of vehicle

2. Attempt all parts:-

2-a. What is one factor-at-a-time(OFAT)? CO 1 2

2-b.	Derive expected mean squares for a two factor (both random) factorial design. CO 2	2
2-c.	Why expected –mean square column is required in ANOVA? CO 3	2
2-d.	What is orthogonal array in design of experiments? CO 4	2
2-e.	Differentiate between traditional design and robust design. CO 4	2

SECTION B 20

3. Answer any five of the following:-

3-a.	What is a 3x4 factorial design? CO1	4
3-b.	How many coupons of alloy should be tested in each quenching solution? CO 1	4
3-c.	Write a steps for The Kruskal–Wallis Test. CO 2	4
3-d.	What is significance of Dispersion Effects. CO 2	4
3-e.	Explain the Analysis of the Fixed Effects Model. CO 3	4
3-f.	Is it possible to find overall optimal combination for IC engines using Taguchi method? CO 4	4
3-g.	Write short notes on: (i) Objective functions in Robust Design. CO 4	4

SECTION C 35

4. Answer any one of the following:-

4-a.	Explain the Probability Distributions with suitable example. CO 1	7
4-b.	Explain the dot diagram. CO 1	7

5. Answer any one of the following:-

5-a.	Write the advantages and disadvantages of Statistical Analysis. CO 2	7
5-b.	Write a short note on Operating Characteristic Curves. CO 2	7

6. Answer any one of the following:-

6-a.	Explain the quadratic model. CO 3	7
6-b.	What do you understand from the test 2k factorial design? Explain with an example. CO 3	7

7. Answer any one of the following:-

7-a.	Explain the Taguchis loss fuction. CO 4	7
7-b.	How do you interpret signal-to-noise ratio Taguchi? CO 4	7

8. Answer any one of the following:-

8-a.	What are the three stages of Taguchi product development? CO 3	7
8-b.	Where we use Robust design? CO 4	7