Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–III (NEW) EXAMINATION – SUMMER 2017

Subject Code: 2732806 Date: 02/05/2017

Subject Name: Design of Experiment

Time:02:30 pm to 05:00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** What do you mean by random variables? Give application and properties of normal and t- distribution. **07**

(b) Is it possible that a false hypothesis will be accepted? How would you explain this? **07**

Q.2 **(a)** Construct an analysis of variance table for following example. **07**

There are four laboratories and each laboratory measures the tin-coating weights of 12 Discs and that the results are as follows:

Lab A	Lab B	Lab C	Lab D
0.25	0.18	0.19	0.23
0.27	0.28	0.25	0.30
0.22	0.21	0.27	0.28
0.30	0.23	0.24	0.28
0.27	0.25	0.18	0.24
0.28	0.20	0.26	0.34
0.32	0.27	0.28	0.20
0.24	0.19	0.24	0.18
0.31	0.24	0.25	0.24
0.26	0.22	0.20	0.28
0.21	0.29	0.21	0.22
0.28	0.16	0.19	0.21

(b) Explain the sampling Distribution of the mean (σ known). **07**

OR

(b) Hinton press hypothesizes that the average life of its largest web press is 14500 hrs. They know that standard deviation of press life is 2100 hrs. From a sample of 25 presses, the company finds a sample mean of 1300 hrs. At a 0.01 significance level, should the company conclude that the average life of the presses is less than the hypothesized 14500 hrs? **07**

Q.3 **(a)** Give properties of maximum likelihood estimators. **07**

(b) Explain the relationship between confidence level and confidence interval. **07**

OR

Q.3 **(a)** Discuss guidelines for designing experiments. **07**

(b) Describe the analysis of completely randomized designs with suitable example. **07**

Q.4 **(a)** Explain the two factor factorial design in detail. **07**

(b) Describe confidence interval on regression coefficients with suitable example. **07**

OR

Q.4 **(a)** Explain why and how we use lack of fit analysis. **07**

	(b)	Explain the general factorial design with suitable example.	**07**
Q.5	**(a)**	Explain the method of steepest ascent.	**07**
	(b)	Discuss importance of central composite design and face centered cuboidal designs.	**07**

OR

Q.5	**(a)**	Explain box-behnken design in detail.	**07**
	(b)	Derive equation of predicted response at the stationary point for second order response surface.	**07**

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