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M.Tech (ME) (2017 Batch) (Sem.–2)

RESEARCH METHODOLOGY

Subject Code : MTME-201

M.Code : 74977

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

1. a. Describe the different types of research, clearly pointing out the difference between an experiment and a survey.

   b. "*Research is much concerned with proper fact finding, analysis and evaluation*." Do you agree with this statement? Give reasons in support of your answer.

2. "*The task of defining the research problem often follows a sequential pattern*". Explain.

3. a. What are the three main disadvantages of the conventional design of experiments approach as compared with Taguchi's method?

   b. Explain the three stages in the process of achieving desirable quality in design.

4. a. What are orthogonal array?

   b. The Taguchi method is considered a technique that helps build quality into a product or process Explain what aspect of quality it influences and how.

5. The quality control department of fabric finishing plant is studying the effect of several factors on the dyeing of cotton - synthetic cloth used to manufacture men shirts. Three cycle times (A): 40 min, 45 min and 50 min, two temperature (B) 250° and 300°, two operators (C), two shifts (D) and two vendors (E) were selected for the experimentation. Factor A is a three -level factor and the remaining four factors are two level factors. The investigator has decided to use L_8 orthogonal array with three replications for each trail. The assignment of factors and data are shown in table below. Analyze the data and draw conclusions at a significance level of .05 using ANOVA for un-pooled as well as pooled variance.

Trial No.	Factors and Interactions					Replications		
	A	B	C	D	E			
	Column Number							
	1	4	5	6	7	1	2	3
1	1	1	1	1	1	9	8	6
2	1	2	2	2	2	4	4	6
3	2	1	1	2	2	6	9	3
4	2	2	2	1	1	7	8	7
5	3	1	2	1	2	2	4	4
6	3	2	1	2	1	6	4	2
7	1	1	2	2	1	3	2	4
8	1	2	1	1	2	8	9	6

6. a. What is central composite design?

   b. Gives the runs of CCD of second order model.

   c. Give the formulas to get the co-ordinates of the stationary points of a quadratic model of central composite design.

7. How does the case study method differ from the survey method? Analyze the merits and limitations of case study method in sociological research.

8. a. List and explain the steps of S/n ratio approach.

   b. Distinguish between the path of steepest ascent and path of steepest decent.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.