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Design of Experiments & Analysis
(1080)

P. Pages : 2

Time : Three Hours **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Answer **any five** questions.
5. Neat diagram must be drawn wherever necessary.
6. Figure to right indicate full marks.
7. Use of electronic pocket calculator is allowed.
8. Assume suitable data, if necessary.

1. a) Describe the different involved in research process. **20**

b) Write short note on.
i) Motivation in research.
ii) Criteria of good research.

2. a) Explain the following Research design :
i) Latin Square design
ii) Random replication design.

b) Explain the different method of collecting data. List its merits and demerits. **20**

3. a) State the characteristics of good sample design and explain the different types of sample design. **20**

b) Describe fully the techniques of defining a research problem.

4. a) Write the reasons for using Heuristics in research modelling. Explain the various Heuristics methods.

b) Give the classification of simulation models and explain the steps of simulations. **20**

5. a) Explain the following terms with respect to Design of Experiment.
i) Replication
ii) Randomization
iii) Nuisance factor.

b) Design an experiment to study four factors A, B, C and D with three interactions A x C, C xD and A x D. Select orthogonal arry and identify columns for three interactions. **20**

6. a) Write a note on.
i) Steps in Design of experiment
ii) Confidence interval.

b) Explain the meaning of analysis of variance. Describe briefly the technique of analysis of variance for one-way and two-way classification. **20**

7. a) Describe in brief layout of research report.

b) Explain the techniques and importance of oral presentation of research finding. Is only oral presentation sufficient ? Justify it. **20**

8. In an experiment involving four factors A, B, C, D and one interaction A x B. Each trial condition is repeated three times and the observations recorded as shown in Table 1. **20**

i) Determine the total sum of squares and the sum of squares for factor A.

ii) Assuming the "bigger is better" quality characteristic, transfer the result of trial 1 into corresponding S/N ratio.

iii) Prepare the ANOVA on the observed results of an experiments and determine the percentage contribution of each factor from ANOVA table.

Table 1

Column Trial	A 1	B 2	AxB 3	C 4	D 5	6	7	R1	R2	R3
Trial 1	1	1	1	1	1	0	0	45	56	64
Trail 2	1	1	1	2	2	0	0	34	45	53
Trial 3	1	2	2	1	1	0	0	67	65	60
Trial 4	1	2	2	2	2	0	0	45	56	64
Trial 5	2	1	2	1	2	0	0	87	81	69
Trial 6	2	1	2	2	1	0	0	78	73	68
Trial 7	2	2	1	1	2	0	0	45	56	52
Trial 8	2	2	1	2	1	0	0	42	54	47

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