

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013****Subject code: 1721408****Date: 07-06-2013****Subject Name: Research Methodology****Time: 10.30 am – 01.00 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) Describe the different types of research, clearly pointing out the difference between an experiment and a survey. 07
- (b) What is research Design? Explain the basic principle of experimental design in detail 07
- Q.2 (a) What do you mean by Sample Design? What points should be taken into consideration by a researcher in developing a sample design. 07
- (b) The following are the number of departmental stores in 10 cities: 35, 27, 24, 32, 42, 30, 34, 40, 29 and 37. If we want to select a sample of 15 stores using cities as clusters and selecting within clusters proportional to size, how many stores from each city should be chosen? (Use a starting point of 4). 07
- OR
- (b) Determine the size of the sample for estimating the true weight of the cereal containers for the universe with $N = 5000$ on the basis of the following information: 07
- (1) The variance of weight = 4 ounces on the basis of past records.
- (2) Estimate should be within 0.8 ounces of the true average weight with 99% probability.
- Will there be a change in the size of the sample if we assume infinite population in the given case? If so, explain by how much?
- ($z = 2.57$ as per area under normal curve for the given confidence level of 99%).
- Q.3 (a) Point out the possible sources of errors in measurement? What difference does it make whether we measure in terms of a nominal, ordinal, interval and ratio scale? Explain giving Example. 07
- (b) Define Scaling and broadly classify the different Scaling procedures. 07
- OR
- Q.3 (a) Why probability sampling is generally preferred in comparison to non-probability sampling? Explain the procedure of selecting a simple random sample. 07
- (b) Describe Sampling size and how it can be determined by various factors. 07
- Q.4 (a) How do secondary data differ from primary data? What factors should one examine when judging the validity and appropriateness of secondary data? 07
- (b) Explain the difference between collection of data through questionnaire and schedule 07
- OR
- Q.4 (a) Write a brief essay on 'Factor analysis' particularly pointing out its merits and limitations. 07
- (b) Explain the meaning of analysis of variance. Describe briefly the technique of analysis of variance for one-way and two-way classifications. 07

- Q.5 (a) Set up two-way ANOVA table with repeated values for the following information 07
relating to three drugs testing to judge the effectiveness in reducing blood pressure for three different groups of people:

Amount of Blood Pressure Reduction in Millimeters of Mercury

Group of People	Drug		
	X	Y	Z
A	14	10	11
	15	9	11
B	12	7	10
	11	8	11
C	10	11	8
	11	11	7

(5% F-limit for $F(2, 9) = 4.26$; $F(4, 9) = 3.63$)

Do the drugs act differently?

Are the different groups of people affected differently?

Is the interaction term significant?

Answer the above questions taking a significant level of 5%.

- (b) Explain the significance of a research report and narrate the various steps 07
involved in writing such a report.

OR

- Q.5 (a) Given is the following correlation matrix, R , relating to eight variables with 07
unities in the diagonal spaces:

		Variables							
		1	2	3	4	5	6	7	8
Variables	1	1.000	.709	.204	.081	.626	.113	.155	.774
	2	.709	1.000	.051	.089	.581	.098	.083	.652
	3	.204	.051	1.000	.671	.123	.689	.582	.072
	4	.081	.089	.671	1.000	.022	.798	.613	.111
	5	.626	.581	.123	.022	1.000	.047	.201	.724
	6	.113	.098	.689	.798	.047	1.000	.801	.120
	7	.155	.083	.582	.613	.201	.801	1.000	.152
	8	.774	.652	.072	.111	.724	.120	.152	1.000

Using the centroid method of factor analysis, work out the first and second centroid factors from the above information.

- (b) Describe in brief the layout of a research report covering all relevant points. 07
