Seat No.: _____ Enrolment No._____

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: (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%).	07
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 ñFactor analysisò 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 relating to three drugs testing to judge the effectiveness in reducing blood pressure for three different groups of people: 07

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 involved in writing such a report. 07

OR

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

Variables

Variables	1	2	3	4	5	6	7	8
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

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