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First Semester MBA Degree Examination, Dec.2013/Jan.2014
Quantitative Methods – I

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any THREE full questions from Q.No.1 to 6.
2. Q.No.7 and 8 are compulsory.

- 1 a. What is the necessity of defining a research problem? (03 Marks)
 b. Differentiate between probability and non-probability sampling techniques. (07 Marks)
 c. Briefly explain the Likert-type scales procedure and its relative merits and demerits. (10 Marks)
- 2 a. What is a questionnaire? (03 Marks)
 b. The average daily wage of all workers in a factory is Rs.444. If the average daily wages paid to male and female workers are Rs.480 and Rs.360 respectively. Find the percentage of male and female workers employed by the factory. (07 Marks)
 c. The table shows the number of motor registrations in a certain territory for a term of 5 years and the sale of motor tyres by a firm in that territory for the same period.

Year	Motor registration	No. of tyres sold
1	600	1,250
2	630	1,100
3	720	1,300
4	750	1,350
5	800	1,500

Find the regression equation to estimate the sale of tyres when more registration is known. Estimate sale of tyres when registration is 850. (10 Marks)

- 3 a. What do you understand by rank correlation? (03 Marks)
 b. Every one out of 15 telephone calls between 2pm and 4pm of a week is busy. Find the probability that out of 6 randomly selected telephone numbers are called:
 i) exactly two; ii) not more than 3; iii) at least 3 of them are busy? (07 Marks)
 c. A company has the head office at Kolkata and a branch at Mumbai. The personnel director wanted to know if the workers at the two places would like the introduction of a new plan of work and a survey was conducted for this purpose. Out of a sample of 500 workers at Kolkata, 62% favoured the new plan. At Mumbai, out of a sample of 400 workers, 41% were against the new plan. Is there any significant difference between the two groups in their attitude towards the new plan at 5% level? (10 Marks)
- 4 a. Name the important multivariate techniques and explain the important characteristics of each one of such techniques. (05 Marks)
 b. Find the number of permutations of letters in the word 'statistics'. (05 Marks)
 c. The daily wages of 1000 workmen are normally distributed around a mean of Rs.70 and with a standard deviation of Rs.5. Estimate the number of workers whose daily wages will be i) between Rs.70 and 72; ii) between Rs.69 and 72; iii) more than Rs.75; iv) less than Rs.63. (10 Marks)
- 5 a. In a certain factory turning out razor blades there is a small change of 0.002 for any blade to be defective. The blades are supplied in packets of 10. Use Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 10,000 packets. (05 Marks)

- b. A machine is designed to produce insulating washers for electrical devices of average thickness of 0.025cm. A random sample of 10 washers was found to have an average thickness of 0.024cm with a σ of 0.002cm. Test the significance of the deviation value of t for 9 degrees of freedom at 5% level is 2.262. (05 Marks)
- c. Ten competitors in a beauty contest are ranked by 3 judges as follows:

Judges	Competitors									
	1	2	3	4	5	6	7	8	9	10
A	6	5	3	10	2	4	9	7	8	1
B	5	8	4	7	10	2	1	6	9	3
C	4	9	8	1	2	3	10	5	7	6

Discuss which pair of judges has the nearest approach to common taste of beauty. (10 Marks)

- 6 a. Find the: i) Lower quartile; ii) Upper quartile; iii) 7th decile and iv) both percentile.

Wages (Rs.):	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of workers:	1	3	11	21	43	32	9

(10 Marks)

- b. Out of a sample of 120 persons in a village, 76 persons were administered a new drug for preventing influenza and out of them 24 persons were attacked by influenza. Out of those who were not administered the new drug, 12 persons were not affected by influenza.

Prepare i) 2×2 table showing actual and expected frequencies; ii) Use Chi-square test for finding the new drug is effective or not. (At 5% level of one degree of freedom, the value of χ^2 is 3.84). (10 Marks)

- 7 a. A company has 22 sales executives. They underwent a training programme. Which test must evaluate whether the sales performance is unchanged or improved after the training programme and frame the hypothesis. (05 Marks)
- b. A cooperative bank has 4000 customers who have taken personal loan or vehicle loan. Of late, the bank feels that there has been an increase in the number of defaulters. The bank would like to know whether people who are regular and defaulters differ in terms of characteristics such as age, income, occupation, sex and marital status. For the above mentioned scenario lay down your recommendation of the most suitable type of research. Explain the reason for your choice. (05 Marks)
- c. Comment on the following: Positive correlation $r = 0.9$, is found between the number of children born and exports over last decade. (05 Marks)
- d. The ratio of the σ to the $\bar{X} \left(\frac{\sigma}{\bar{X}} \right)$ is known as. (05 Marks)

- 8 a. Design a questionnaire to study the customer retention as adopted by Textile Retail Outlets. (10 Marks)
- b. 5 doctors each test 5 treatments for a certain disease and observe the number of days each patient takes to recover. The results are given in below table. Discuss the difference between i) the doctors and ii) the treatment. Use $\chi = 0.05$.

Doctors	Treatments				
	1	2	3	4	5
1	10	14	23	18	20
2	11	15	24	17	21
3	9	12	20	16	19
4	8	13	17	17	20
5	12	15	19	15	22

(10 Marks)
