MBA 3rd Semester Examination 2013
Paper - IX
(Statistics for Management)

Time : 3 Hrs. Full Marks : 80

1. Answer any five questions from the following (each within 50 words) 2×5 = 10
   (a) A family has three children. List all the possible combinations in a sample space and then obtain the probability that all the three children will be girls.
   (b) Calculate the mean and variance of x, if x can assume the 4 values 0, 1, 2, 3 with equal probabilities.
   (c) Explain the concept of Bernoulli Trials.
   (d) What is a Time Series?
   (e) What is rank corelation?
   (f) Define null and alternative hypotheses in statistical tests of significance.
   (g) Explain the condition under which Poisson distribution becomes an approximation of Binomial distribution.
2. Answer any three questions from the following (each within 100-150 words) 4×3 = 12
   (a) If a new drug is found to be effective 40% of the time, then what is the possibility that in a random sample of 4 patients, it will be effective on 2 of the patients.
   (b) What are the various non-probabilistic methods of

sampling? Describe any one.

(c) State under what assumptions t-test is applied in testing of hypothesis. Also mention the two conditions to be fulfilled for the application of t-test.

(d) Write a note on the assumptions made in regression analysis.

(e) What is trend analysis? Explain any one methods of measuring trend.

3. Answer any three questions from the following (each within 200-250 words) $6\times3 = 18$

(a) Briefly describe the normal distribution. Mention the characteristics and properties of normal distribution.

If x is a N (μ, σ) variate then what will be the expression for the standard normal variate z.

(b) In case of large samples, describe the procedure for testing the significance of an observe sample mean. Also describe how two sample means are tested for their equality in case of large samples.

(c) State Bayes theorem. 3+3 = 6

Packet I contains 3 novels and 2 short story collections. Packet II contains 2 novels and 4 short stories. One packet is chosen at random and a book is taken out from it. The book happens to be a novel. What is the chance that it has been taken from packet I.

(d) Differentiate between secular Trend and cyclical fluctuations. How will you measure the cyclical variation?

(e) What is the importance of correlation analysis? How will you determine the coefficient of determination? 3+3= 6

4. Answer any four questions from the following (limit your answer within 300-400 words) $10\times4 = 40$

(a) (i) Define independent events and mutually exclusive events. Can two mutually exclusive events be independent at the same time. Also explain the concept of conditional probability. 3+1+3=7

(ii) If A and B are two independent events then show that the complementaries $\bar{A}$ and $\bar{B}$ will also be independent. 3

(b) What is a random variable and what is its expectation? State the addition and product rule of expectation. Show that if

$y = a + bx$ then $E(y) = a + bE(x)$ and $Var(y) = b^n Var(x)$.

If two perfect dice are thrown, what is the expected total number of points? 3+2+3+2=10

(c) (i) For the variable x and y, the two regression lines are $3x + 2y = 25$ and $6x + y = 30$. Identify which one of them is the regression line of y on x. 4

(ii) Ten brands of products were ranked by two panels of judges and the rankings are given below : 6

	A	B	C	D	E	F	G	H	I	J
Panel I	3	8	5	4	7	10	1	2	6	9
Panel II	6	4	7	5	10	3	2	1	9	8

Calculate the Spearman's rank coorelation coefficient and give your comments.

(d) Mr. X and Mrs. Y are partners in a business. The volume of sales, in lakhs of rupees for the first 7 months of 2013 are as follows :

Month :	Jan	Feb	Mar	Apr.	May	June	July
Sales :	45	52	41	36	49	47	43

Mr. X, by using exponential smoothing method with an α - value of 0.4 attempted forecasting the value of sales in

August. But Mrs. Y thinks that a α-value of 0.8 would give better result. What is Mr. X's forecast and what is Mrs. Y's forecast? Whose prediction, in your opinion, is more correct?

(e) (i) Differentiate between non-sampling error and sampling errors. What steps can be taken to minimise the impact of such errors upon statistical analysis?

3+3=6

(ii) A company supplied 500 units of an item. The number of defectives was found to be 42 as against the company's conviction that 6% items could be difective. Examine the tenability of the company's claim. 4

(f) (i) The specimen of copper wires drawn from a large lot have the following breaking strength (in kg. wt.) :

78, 72, 70, 68, 72, 78, 70, 72, 96, 44

Test whether the mean breaking strength of the lot may be taken to be 78 kg. wt. [$t_{0.05,\ 9\ d.f.} = 2.262$] 5

(ii) Sample of sales in similar shops in two towns are taken for a new product with the following results :

	Mean sales	Variance	Sample size
Town A	57	5.3	5
Town B	61	4.8	7

Is there any evidence of difference in sales in the two towns? [$t_{0.05,\ 10\ d.f.} = 2.228$] 5

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