2015

M. Com.

2nd Semester Examination

ADVANCED BUSINESS STATISTICS

PAPER — COM-203

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Unit—I

[Marks : 20]

1. Answer any *two* of the following questions :   2×5

   (a) Explain the concept of probability distribution. Give two examples of how probability distribution is used to decision making process.

   (b) Find the mean and variance of Poisson distribution.

   (c) In a binomial distribution with 6 independent trails,

the probabilities of 3 and 4 successes are found to be 0.2457 and 0.0819 respectively. Find the parameters 'p' and 'q' of the binomial distribution.

(d) Define standard error of a statistic. State the formulas of the standard error of the sample mean and sample proportion. 1+4

2. Answer any *one* question from the following : 1×10

(a) (i) A lock manufacturing company supplies locks to a retailer in different batches. A single batch size contains 300 locks. The company's past record suggests that, on an average, in a single batch, 10 locks are defective. The number of defects per batch follows Poisson distribution. In a random selection of locks in a batch:

- what is the probability of finding eight or fewer defectives in a batch ?

- what is the probability that the batch contains $6 < x < 10$ defectives ? 5

(ii) The total income distribution of workers in a factory was fund to be normal with mean of ₹500 and SD equal to ₹50. There are 228 persons getting above ₹600. How many persons were there in all ? [*Given area under the standard normal curve between 0 and x is 0.4772*] 5

(Continued)

(b) (i) What is the difference between a sample and a census, and why is sampling so important for a researcher ?

(ii) What is an error ? Differentiate between sampling and non-sampling error ? 4+(2+4)

Unit—II

[Marks : 20]

3. Answer any *two* of the following questions : 2×5

(a) (i) What is interval estimation ?

(ii) Out of 50,000 life insurance policies, a sample of 200 policies were taken and it is found that 10 policies are less than Rs. 5000. How many policies can be reasonably expected to be insured for less than Rs. 5000/- in the whole lot ? Estimate at 95% level. 5

(b) A defective dice has been rolled by three friends A, B and C independently for 45, 50 and 60 times respectively. In the outcomes of their rolling A got 15 'six', both B and C got 10 'six' each. Find the maximum likelihood estimate of the probability of 'six' from rolling of the dice. 5

(c) Distinguish between 5

    (i) Null-hypothesis and Alternative hypothesis ;

    (ii) Type-I Error and Type-II Error.

(d) 1000 college students were classified according to their intelligence and economic conditions. Test whether there is any association between intelligence and economic conditions : 5

		Intelligence			
		Excellent	Good	Mediocre	Dull
Economic	Good	55	180	150	60
Condition	Not Good	90	195	180	90

4. Answer any *one* of the following : 1×10

    (a) (i) Write a brief note on power of statistical test.

      (ii) The following data show the cost in hundred rupees per square feet of the floor area of randomly selected 7 schools and 5 office blocks from those completed during the period 2012 to 2014 :

School	28	31	26	27	23	38	37
Office blocks	37	42	34	37	35	–	–

Do the data support the hypothesis that the cost per square feet for the office blocks was more than that for schools ? Test the hypothesis at 5% level of significance. 3+7

(b) (i) State the relative advantages of non-parametric test over its parametric counterpart.

(ii) A cake preference score is a combination of four components, *viz.* tastes, appearance, smell and texture. The minimum score is 0 and the maximum is 100. Three cake formulations are compared using these scores by three panels of tasters and the scores are given below :

Formulation-1 (X_1)	1.7	1.9	6.1	12.5	16.5	25.1	30.5	42.1	82.5
Formulation-2 (X_2)	19.8	25.2	46.2	46.2	61.1	–	–	–	–
Formulation-3 (X_3)	13.4	20.9	25.1	29.7	46.9	–	–	–	–

The catering manager concludes that the three cake formulations are equally preferred. Test the claim of the manager applying Kruskall-Wallis test, at 5% level.

3+7

[Internal Assessment : 10 Marks]

———

(Turn Over)