2022

M.Com.

2nd Semester Examination

ADVANCED BUSINESS STATISTICS

PAPER—COM-202

Full Marks : 50

Time : 2 Hours

The figures in the 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 – 1

1. Answer any *two* questions :   2×2

   (a) Explain the concept of probability distribution with an example.

   (b) The incidence of the Coronavirus is such that on the average of 20% of people suffer from it. If 10 people are selected at random, find the probability that exactly two people suffer from the Coronavirus.

(c) Is there any inconsistency in the statement, the mean of binomial distribution is 40 and its standard distribution 4 ? If no inconsistency is found, what shall be the values of n ?

(d) Distinguish between Statistics and Parameter. Give examples.

2. Answer any *two* questions :   2×4

(a) Briefly discuss the use of probability distribution in decision making process of a business. Give suitable examples.

(b) A car hire firm has two cars, which it hirs out day by day. The number of demands for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the proportion of days on which no car is used and the proportion of days on which some demand is refused.

(Given e^{-1} = 0.3679, $e^{-1.5}$ = 0.2231 and e^{-3} = 0.0498)

(c) The average daily food expenditure of families in a certain area has a normal distribution with mean Rs. 125 and standard deviation Rs.

(Continued)

25. What is the probability that a family selected at random from this area will have an average daily expenditure on food in excess of Rs. 175? What is the probability that out of eight such families selected at least one family will have their daily food expenditure in excess of Rs. 175?

(d) "Sampling is a necessity under certain conditions." Illustrate this by suitable example.

3. Answer any *one* question : 1×8

(a) (i) Derive the mean and variance of Binomial distribution.

    (ii) Out of 320 families with 5 children each, what percentage would be expected to have (i) 2 boys and 3 girls and (ii) at least one boy? Assume equal probability for boys and girls.

(b) (i) What do you mean by 'Standard Error'? How do you distinguish between 'Standard Error' and 'Standard Deviation'?

    (ii) What is non-sampling error or bias? How does it arise in sampling?

(2+2)+(2+2)

Unit – 2

4. Answer any *two* questions :   2×2

   (a) What do you understand by statistical inference ?

   (b) Give the names of some important methods applied for 'point estimation'.

   (c) The mean weight of students of a sample of size 220 drawn from a normal population shows 55 kgs with a standard deviation of 16 kgs. Calculate the standard error of sample mean $(S.E._{\bar{x}})$.

   (d) State any two applications of student's t-test.

5. Answer any *two* questions :   2×4

   (a) Make an interval estimation of population mean μ with the help of a sample of size n, when the population standard deviation σ is known.

   (b) State the important properties of a maximum likehood estimator.

(c) Distinguish between :

(i) Null hypochesis and Alternative hypothesis,

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

(d) What is degree of freedom ? What precautions would you like to take for applying Chi-square (χ^2) test ?

6. Answer any *one* question : 1×8

(a) A certain stimulus administered to each of 12 patients resulted in the following changes in blood pressure 5, 2, 8, –1, 3, 0, –2, 1, 5, 0, 5, 6. Can it be concluded that the stimulus will in general be accompanied by an increase in blood pressure ?

[Given : $t_{0.05, \ 11}$ = 1.796]

(b) A study of 1200 bike riders in Midnapore twon reveals the following information :

	Using Helmet		
	Never	Occasional	Frequent
Troubled with Traffic Police	170	55	15
Not-troubled with Traffic Police	455	320	185

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Using chi-square (χ^2) test find whether there is any association between Helmet use and Police trouble.

[Given : the table value of χ^2 at 5% level of significance and for 2 degree of freedom is 5.99]

[Internal assessment – 10]

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