

M.Com. 2nd Semester Examination, 2011

ADVANCED BUSINESS STATISTICS

PAPER—COM-203

Full Marks : 50

Time : 2 hours

The figures in the right-hand margin indicate marks

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

Illustrate the answers wherever necessary

UNIT – I

1. Answer any two questions : 5 × 2

- (a) Explain how the knowledge of probability distribution helps in decision making process to a businessman ? Give some examples.

(Turn Over)

(b) A multiple-choice test consists of 8 questions with 3 answers to each question (of which only one is correct). A student answers each question by rolling a balanced dice and choose the first answer if he gets 1 or 2, the second answer if he gets 3 or 4 and the third answer if he gets 5 or 6. To get a distinction, the student must secure at least 75% correct answers. If there is no negative marking, what is the probability that the students secures a distinction ?

(c) Proof that Poisson distribution is as an approximation of the Binomial distribution.

(d) In a town 2 accidents took place in a span of 50 days. Assuming that the number of accidents per day follows the Poisson distribution, find the probability that there will be three or more accidents in a day.

2. Answer any *one* question : 10 × 1

(a) (i) Mention the important properties of Poisson distribution.

- (ii) As a result of tests on 20,000 electric bulbs manufactured by a company, it was found that the lifetime of the bulb was normally distributed with an average life 2,040 hours and standard deviation of 60 hours. On the basis of this information estimate the number of the bulbs that are expected to burn for (I) more than 2150 hours, and (II) less than 1960 hours.

Proportion of area under the Standard Normal Curve.

<u>Z</u>	<u>Area</u>	<u>Z</u>	<u>Area</u>	<u>Z</u>	<u>Area</u>
1.23	0.3907	1.33	0.4082	1.43	0.4236
1.63	0.4484	1.73	0.4582	1.83	0.4664

4 + 6

- (b) (i) Distinguish between the census and sampling methods of data and discuss the merits of each of them.

- (ii) Explain the method of drawing a stratified sample. Mention its merits and demerits.

5 + 5

UNIT – II

3. Answer any *two* questions : 5 × 2

(a) State the important properties of a maximum likelihood estimator.

(b) Write down the steps to be followed in testing of hypothesis.

(c) Find the Poisson parameter λ with the help of maximum likelihood estimation method.

(d) A random sample of 500 apples was taken from a large consignment and 60 was found to be bad. Obtain 99% confidence limits for the percentage number of bad apples in the consignment.

4. Answer any *one* question : 10 × 1

(a) (i) Write a brief note on 'Central Limit' theorem.

(ii) The percentage reduction of cavities by 3 different toothpastes is given in the following table :

Colgate : 50 29 28 29 45 42 30 32 35 38

Pepsodent : 28 35 31 30 41 41 28

Dabur : 30 32 31 28 47 31

Applying Kruskal-Wallis 'H' statistic, test whether the above toothpastes are equally effective in reducing cavities. (Test at $\alpha = 0.05$).

[Given $\chi^2_{0.05, 2} = 5.99$] 3 + 7

(b) (i) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal, are the same against that they are not, at 5% level.

(6)

(ii) Write short notes on :

(A) Type-I and Type-II error

(B) Power of the test.

6+(2+2)

[*Internal Assessment : 10 Marks*]
