

2019

M.COM.

2nd Semester Examination

ADVANCED BUSINESS STATISTICS

PAPER - COM-202

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.

(Turn Over)

UNIT – I (Marks : 20)

1. Answer any TWO question from the following :
2 X 2
- a) Under what conditions is the Poisson probability distribution appropriate?
 - b) For a binomial distribution the mean and variance are respectively 4 and 3. Calculate the probability of getting a non-zero value of the variate.
 - c) State whether the following statements are true or false:
 - i) The mean of binomial distribution is np and its standard deviation is npq .
 - ii) The mean of binomial distribution is 20 and its variance is 9.
 - d) Distinguish between Statistic and Parameter. Give examples.
2. Answer any TWO questions from the following :
4 X 2
- a) There are 60 M.Com. 2nd Semester students in the post-graduate department of Vidyasagar University, and the probability for any student to need a copy of particular Statistics book from the university library on any day is 0.05. There are five books kept in the library. Calculate the probability that in a particular day no book is demanded by the students and the probability that in a particular day on which some demand is refused. (Given $e^{-5} = 0.0067$, $e^{-0.05} = 0.9512$ and $e^{-3} = 0.0498$)

- b) Assume that the mean height of soldiers to be 68 inches with a variance of 9 inches. What is the probability that a soldier selected at random from the regiment will have more than 6 fit tall? What is the probability that out of 5 soldiers selected at random at least 2 of them will have more than 6 fit tall?
- c) State the important properties of Poisson distribution.
- d) Explain the concept 'standard error of mean'.

3. Answer any ONE question from the following:

8 X 1

- a) i) In a multiple choice examination, there are 20 questions. Each question has four alternative answers and the students must select the one correct answer. Four marks are given for the correct answer and one mark is deducted for every wrong answer. A student must secure at least 50% of the total marks to pass the examination. Suppose that a student has not studied at all so that he decides to select the answers to the questions on a random basis. What is the probability that he will pass the examination?
- ii) Assume that the marks obtained by the commerce students in the PG admission test of Vidyasagar University are normally distributed with a mean of 56 and a standard deviation of 8.
- What percentage of students got marks between 48 and 64?
 - If the university will not admit one scoring below 44, what percentage of students would be acceptable to the university for admission in the said PG course?

4 + 4

- b) i) A population consists of the four members 2, 6, 8, 12. Consider all possible samples of size two, that can be drawn with replacement from the population. Also find —
- The population mean,
 - The population standard deviation
 - The mean of the sampling distribution of means.
- ii) Discuss the relative advantages of sample survey over the census survey. **(1+1+3) + 3**

Unit – II (Marks :20)

- 4. Answer any TWO of the following questions: 2 x 2**
- a) Define sample statistic.
 - b) What do you understand by degree of freedom?
 - c) What is critical region?
 - d) What is an unbiased estimator?
- 5. Answer any TWO of the following questions: 4 x 2**
- a) What is testing of hypothesis? Distinguish between Type-I error and Type-II error.
 - b) Estimate the Poisson parameter λ with the help of maximum likelihood estimation method.
 - c) What is interval estimation? In a random sample of 200 students from English Medium Schools of Kolkata, 20 are found to have eye sight problem. Make an interval estimation of the proportion of students in English Medium Schools of Kolkata have eye sight problem at 95% confidence level.

- d) The following is the dataset of normal body temperature (in degree celcius) measured on 65 male and 65 female of Kharagpur.

Gender	Sample size	Mean temperature	S. D. of temperature
Male	65	98.10	0.69
Female	65	98.40	0.75

Do you find any significant difference in the average body temperature of male and female?

Test at $\alpha = 0.05$.

6. Answer any one of the following questions: 8 x 1

a) i) Write down the situation where paired- t test is applied?

ii) Two random samples are collected from two Pizza suppliers in Burdwan town regarding their delivery time (in minute). The recorded data is as follows :

Pizza Hut	Domino's Pizza
20.4	20.2
24.2	16.9
15.4	18.5
21.4	17.3
20.2	20.5
18.5	—
21.5	—
Mean = 20.23	Mean = 18.68
S. D. = 2.74	S. D. = 1.64

Test at 5% significance level whether there is any significant difference in the delivery time of two Pizza suppliers. **(2+6)**

- b) i) What precautions will you take before applying chi-square test?
- ii) A study has been conducted on a random sample of 380 people to examine whether herbs have any significant effect for preventing sickness. The observed data is presented below:

	Herb A	Herb B	Placebo
Sick	20	30	30
Not Sick	100	110	90

Test at 5% level whether sickness is independent from taking herbs. **(2+6)**

[Internal Assessment - 10 marks]