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UNIVERSITY EXAMINATIONS 2024/2025

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR DEGREE OF BACHELOR
OF COMMERCE

BFC 3436: ADVANCED BUSINESS CALCULATION

DATE: DECEMBER 2024

TIME: 2 HOURS

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

- a) Discuss the terms Estimation and hypothesis testing (5 marks)
- b) Enumerate any four qualities of a good estimator (5 marks)
- c) The quality department of a wire manufacturing company selects a sample of wire specimen in order to test for breaking strength. Past experience has shown that the breaking strength is normally distributed-with a standard deviation of 200kg. A random sample of 64 specimens gave a mean of 6200kg, Find the population mean at 95% level of confidence (5 marks)
- d) The average monthly water consumption for a sample of 100 families is 1250 units. Assuming the standard deviation of water consumption is 150 units, test the hypothesis that mean consumption is 1200 units among the house holds (5 marks)
- e) Distinguish the following terms as used in Statistical inferences
 - i. Population and Sample
 - ii. Point estimation and interval estimation
 - iii. Type I error and type II error
 - iv. One tail test and two tail test
 - v. Continuous and Discrete variable (10 marks)



QUESTION TWO (20 MARKS)

- a) By citing examples briefly explain the difference between a parameter and a statistic
(4marks)
- b) Businessman dealing with bulbs found that 3% of the bulbs he bought were defective. in a sample of 1000 bulbs, find the probability more than 5 are defective (5 marks)
- c) A sample of 600 accounts was taken to test the accuracy of posting and balancing- of accounts wherein 45 mistakes were found. Find out the population proportion. Use 99% level of confidence (6 marks)
- d) A firm wishes to estimate with maximum allowable error of 0.05 and a 95% level of confidence, the proportion of consumers who prefer product. How large a sample will be required in order to make such an estimate if the preliminary sales reports indicate that 25 percent of all consumers prefer the firm's product? (5 marks)

QUESTION THREE (20 MARKS)

- a) A cigarette manufacturer wishes to use a random sample to estimate the average nicotine content. The sampling error should not be more than One milligram above or below the true mean with 99% confidence level. The population standard deviation is 4 milligrams, what sample size should the company use in order to satisfy these requirements? (5 marks)
- b) A random sample of 16 people is taken and 12 were in favour of liberalizing licensing laws. With 99% confidence what proportion of all people are in favour? (5 marks)
- c) A factory is producing 50,000pairs of shoes daily. From a sample of 500 pairs , 20% were found to be of substandard Estimate the of pairs that be reasonably expected to be spoiled in the daily production and assign limits at 5% level of significance (5 marks)
- d) A child welfare officer asserts that the mean sleep of babies is 14 hours a day. A random sample of 64 babies shows that their mean sleep was only 13 hours a day with a standard deviation of 3 hours. At 5% level of significance test the assertion that mean sleep of babies is less than 14 hours a day



QUESTION FOUR (20 MARKS)

- a) The mean weight of 500 female students in a certain college is 60 kg and the standard deviation is 15kg- Assuming the weight is normally distributed, find how many students weigh;
- i. Between 55 and 65 (4 marks)
 - ii. Less than 50 (3 marks)
 - iii. More than 70 (3 marks)
- b) A sample of 100 motor car tyres has a mean of 20,000 miles and a standard deviation of 900 miles. A second sample of 105 tyres has a mean of 22,000 miles and a standard deviation of 900 miles. Is it true to say that the two samples were drawn from the same population? (10 marks)

QUESTION FIVE (20 MARKS)

By citing examples discuss the following terms

- i. Quantitative and Qualitative variables
 - ii. Systematic sampling
 - iii. Quota sampling
 - iv. Multi- stage sampling
- 5 marks each

