



# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

*Faculty of Engineering & Technology*

DEPARTMENT OF COMPUTER SCIENCE

HIGHER DIPLOMA IN COMPUTER STUDIES

SEMESTER I EXAMINATIONS

APRIL/MAY 2010 SERIES

## FOUNDATION OF QUANTITATIVE TECHNIQUE

TIME: 2 HOURS

### **Instructions to Candidates:**

This paper consists of **FIVE** questions.

Answer Question **ONE** and any other **TWO** Questions

### **Question ONE**

- (a). Define the following terms as used in sampling:
- (i). Population
  - (ii). Sample
  - (iii). Sample statistic
  - (iv). Population parameter
- (8 Marks)**
- (b). A multination company has 100,000 computers whose standard deviation is 35. Random whose standard deviation is 35. Random samples of 6,000 computers each are selected. Find the standard error of the samples?
- (4 Marks)**
- (c). During a normal day, the average number of lorries that unload at a depot is 3 per hour. Find the probability that in any hour at most 2 lorries will arrive to unload.
- (4 Marks)**
- (d). Explain on the following types of estimators.
- (i). Point estimate.
  - (ii). Interval estimate.
- (4 Marks)**
- (e). It is estimated that 80% of PC users have installed proprietary operating system. In a group of 1,000 pc users, compute the:
- (i). Mean
- (2 Marks)**
- (ii). Standard deviation of the users of proprietary operating system.
- (3 Marks)**
- (f). A random sample of 50 debts showed that the mean debt was £92.50 with a standard of £24.05. Determine a 95% confidence limit for the mean debt.
- (5 Marks)**

### **Question TWO**

- (a). Explain briefly on the following probability distributions.
- (i). Normal distribution
  - (ii). Binomial distribution

(iii). Poisson distribution

(b). It is expected that 10% of the production from a continuous process will be defective and scrapped. Determine the probability that in a sample of ten units chosen at random.

(i). Exactly **TWO** will be defective.

(ii). At least **TWO** will be non-defective.

In each case use both the binomial distribution and Poisson distribution.

**(20 Marks)**

### **Question THREE**

(a). Describe the following terms as used in sampling:

(i). Sampling distribution of sample mean.

(ii). Sampling distribution of sample proportion.

(iii). Sampling error.

(iv). Unbiased estimator.

**(8 Marks)**

(b). The time taken to learn the standing orders by members of parliament is normally distributed with a mean of 80 hours. If a random sample of 16 members is selected, find the probability that the mean time to learn the standing orders will be more than 90 hours.

**(4 Marks)**

(c). A company manager wants production estimate to be within 0.02 of the population proportion with a 90% confidence level. Determine the most conservative estimate for the sample size that will limit the maximum error within 0.003 of the population proportion.

**(4 Marks)**

(d). Explain any **TWO** stages involved in the sample survey.

**(4 Marks)**

### **Question FOUR**

(a). Explain on the following sampling methods giving relevant examples on where they can be applied.

(i). Simple random sampling.

(ii). Quota sampling

(iii). Stratified sampling

**(9 Marks)**

- (b). In a random sample of 200 garages it was found that 79 sold car batteries at prices below that recommended by the manufacturer.
- (i). Estimate the proportion of garages selling below the recommended price. **(2 Marks)**
- (ii). Calculate the 99% confidence interval for the proportion.

**Question FIVE**

- (a). Explain the following terms as used in probabilities.
- (i) Random experiment.
- (ii) Event. **(4 marks)**
- (b). The probability that a bulb produced by a factory will fuse after 100 days of use is 0.05. Find the probability that out of 5 such bulbs.
- (i) 0
- (ii) Not more than 1
- (iii) More than 1
- (iv) At least 1
- will fuse after 10 days of use. **(12 marks)**