



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION TECHNOLOGY – DIT 2K 9J, DIT 9M
DIPLOMA IN INFORMATION & COMMUNICATION TECHNOLOGY - DICT 2K 9J

ECS 2303 & EIT 2312: QUANTITATIVE TECHNIQUE I

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: OCTOBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*

Answer question **ONE (COMPULSORY)** in section A and any other **TWO** questions from section B

Maximum marks for each part of a question are clearly shown.

This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

QUESTION ONE

- a) Explain the following terms as applied in Estimation:
- Population parameter
 - Sample statistic
- (4 marks)**
- b) Explain the following types of distributions:
- Normal distribution
 - Binomial distribution
 - Poisson distribution
- (6 marks)**
- c) The time taken to learn the standing order 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)**
- d) In a random sample of 200 garages it was found that 79 sold car batteries at prices below that recommended by the manufacturer.
- Estimate the proportion of garages selling below the recommended price. **(2 mark)**
 - Establish the 99% confidence interval of the proportion. **(6 marks)**
- e) State **FOUR** stages involved in the sample survey. **(4 marks)**
- f) Differentiate between the independent variable and dependent variable as used in regression analysis. **(4 marks)**
- h) Distinguish between the following terms as used under the concept of the sampling distribution.
- Standard error of the mean
 - Standard deviation
- (4 marks).**

SECTION B (ANSWER ANY TWO QUESTIONS)

QUESTION TWO

- a) Explain the following terms with regard to regression analysis:
- Regression
 - Positive gradient
 - Negative gradient
- 6 marks)**
- b) The table below shows the height and weight of a random sample of 10 patient. Use it to answer the questions that follows.

Patient	A	B	C	D	E	F	G	H	J	K
Height in ich.	62	64	66	68	70	72	74	76	78	80
Weight in Kg	66	67	72	72	57	76	72	76	87	82

- i. Using the least squares method, determine the equation of the regression line.
- ii. Estimate the weight of a patient whose height is 71 inches. (14 marks)

QUESTION THREE

a) Define the following terms as used in estimation.

- i. Point estimate
- ii. Confidence interval
- iii. Population
- iv. Sample

(8 marks)

b) A company published a new college textbook last year. Before the company decided at which price to sell the textbook, it had to know the average price of all such textbook in the market. The research department took a sample of 36 of such textbook and collected information on their prices. This information produced a mean price of sh. 48.40 for the sample. The standard deviation of all the textbooks is sh. 4.50.

- i. State the point estimate of the mean price for the textbooks.
- ii. Construct the 95% and 90% confidence interval for the mean of the textbooks. **(12 marks)**

QUESTION FOUR

a) A multinational company has 100,000 computers whose standard deviation is 35. Random samples of 6000 computers each are selected. Find the error of the samples. **(4 marks)**

b) (i) During a normal day, the average number of lorries that unload at a depot is 3 hours. Using poisson distribution find the probability that in any hour at most 2 lorries will arrive to unload. **(5 marks)**

(ii) A farmer packs oranges in crates each containing 250. on average 0.6% of the oranges are found to be bad when the crates are opened. Using Poisson distribution find the probability that in a given crate there will be 2 bad oranges. **(4 marks)**

c) When appointing computer operators, a firm requires the candidates to pass a written examination. The paper contains one hundred multiple choice questions, each with three answers out of which only one is correct. A pass is obtained by answering 40 or more questions correctly. Estimate the probability that a candidate who chooses to answer each question randomly will pass the examination. **(7 marks)**

QUESTION FIVE

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

- i. Simple random sampling
- ii. Quota sampling
- iii. Cluster sampling

(6 marks)

b) Explain the following terms as use in the concept of probabilities:

- i. Random experiment
- ii. Outcome

(4 mark)

c) 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. At least 2
Will fuse after 10 days of use. (use binomial distribution)

(10 marks)