



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering & Technology

DEPARTMENT COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION TECHNOLOGY

(DIT2K9J & DIT09M)

ECS 2311: QUANTITATIVE TECHNIQUE IV

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: FEBRUARY/MARCH 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Calculator and SMP Tables can be used*

This paper consist of **FIVE** questions in **TWO** sections **A & B**

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

QUESTION ONE

- a) State **FOUR** stages involved in building a simulation run: (4 marks)
- b) Describe the following types of simulation:
i. Continuous
ii. Discrete
iii. Analogue (6 marks)
- c) Explain the following components of the cost of holding stock:
i. Storage cost
ii. Cost of capital factor (4 mark)
- d) Explain the term level of significance as applied in hypothesis testing. (2 marks)
- e) The mean life of a random sample of 50 similar torch bulbs drawn from a batch of 500 bulbs is 72 hours. The standard deviation of the life time of sample was found to be 10.4 hour. A batch is classified to be inferior if the mean life of the batch is less than the population mean of 75 hours.

Determine whether as a result of the sample the batch can be considered inferior at a level of significance of I. 5% (4 marks)

SECTION B (Answer any two questions)

QUESTION TWO

- a) Explain the use of random numbers in simulation. (2 marks)
- b) State **FOUR** advantages of simulation. (4 marks)
- c) The schedule of vehicles arriving at a big garage per day for service was recorded as follows:

Number of vehicles	0 - 6	7 - 9	10 - 16	17 - 19	20 - 26	27 - 27	30 - 36
Number of days	9	14	17	22	10	5	3

- i. Using the following random numbers, 9359, 9582, 9900, 1007, 4849, 9522, 6639, 2212, 3732, simulate the number of vehicles arriving at the garage.
- ii. Calculate the expected number of vehicles arriving per day. Give the answer to the nearest whole number. (11 marks)

QUESTION THREE

- a) i) Define the term “Statistical hypothesis. (2 marks)
ii) Outline **two** types of hypothesis tests. (2 marks)
- b) In a Location X with 400 people 48% preferred using small size computers, while in location Y with 300 people, 56% preferred using small size computers. Test whether there is a difference between the proportions in location X and Y at the 5% level of significance. (10 marks)
- c) Differentiate between Critical value and Test statistic. (3 marks)
- d) State the procedure to be followed in hypothesis testing. (3 marks)

QUESTION FOUR

- a) Define the following terms as used in inventory control systems.
i. Order cost
ii. Carrying cost
iii. Zero lead time (6 marks)
- b) The yearly requirement of a manufacturer is 1,000 units of a part that is used at a uniform rate throughout the year. The machine set-up cost per lot is ksh. 30,640 while production cost is ksh. 3,900 per unit. Interest, insurance and taxes are estimated at 12% on average on average. The cost of storing the parts is estimated at ksh. 612 per unit per year.
- i. Calculate the economic batch quantity
ii. Calculate the total stock holding cost. (14 marks)