



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECOND SEMESTER EXAMINATION FOR DIPLOMA IN INFORMATION
TECHNOLOGY

QUANTITATIVE TECHNIQUES

DATE: 1/8/2016

TIME: 2:00 – 4:00 PM

INSTRUCTIONS:

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE

- a) Define the term quantitative technique. (2 marks)
- b) Construct price index number from the following data by applying Paasche's method (4 marks)

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
A	4	20	10	15
B	8	4	16	5
C	2	10	4	12
D	10	5	20	6

- c) Differentiate between quantitative data and qualitative (4 marks)

- d) Fill the following table for number of children in 45 families Round off to 4 decimal place. (4 marks)

No. of children	Frequency	Relative frequency
1	8	-----
2	15	-----
3	11	-----
4	-----	-----
5	3	-----
6	2	-----
	45	-----

- e) State the four components of time series (4 marks)
- f) a) What is correlation? (2 marks)
 b) State the three degrees of correlation which may be observed on scatter diagram between two variables (3 marks)
- g) The three basic decision environment categories are? (3 marks)
- h) What is the probability that when a die is thrown, the uppermost face will be either a two or a three? (2 marks)
- i) State two hypotheses that can be formulated when testing hypothesis (2 marks)

QUESTION TWO

- a) Draw a histogram to represent the data in the table below. (5 marks)

Height (cm)	125-134	135-144	145-154	155-164	165-174
Frequency	6	9	15	5	2

- b) The following data shows the ages of students who attended morning classes in the QT class

47	43	32	41	56	35	48	37	42	40
25	50	52	43	31	42	27	49	38	42
31	38	33	24	23	43	36	33	47	35
27	42	55	51	54	44	56	39	43	46

- i. Construct a frequency distribution table with each class having a class interval of five (inclusive format) and first class starting at 20. (5 marks)
- ii. Construct a "Less than" cumulative curve for the above data. (4 marks)

- c) The marketing manager of a company would like to find whether there is any relationship between the number of sales people and total sales

Sales persons (X)	3	5	2	7	8	4	6
Total Sales (Y)	35	30	28	38	41	34	32

Construct the regression line of the form $Y=a+bX$ and estimate total sales given 9 sales persons. Round each term to two decimal place. (6 marks)

QUESTIONS THREE

The table below shows ages of workers in a factory

50	40	33	34	36	32	58	36	52	35
45	38	27	43	24	39	46	28	41	44
29	42	50	45	53	43	48	30	38	36
35	44	20	37	22	34	46	42	49	44
32	38	43	47	39	37	46	52	35	55
62	43	46	41	43	50	42	44	40	43

- a) Construct the frequency distribution table for the above data. Start with 20-24,25-29 etc (4 marks)
- b) Using the frequency distribution table calculate round off to 2 decimal place. (10 marks)
- Mean
 - Mode
 - Median
- c) Construct a probability tree diagram that describes all three-child families according to the genders of the children with respect to birth order. Find the probability (6 marks)
- All the children are girls
 - Exactly two of the children are girls

QUESTION FOUR

- a) The following table shows the number of days lost through sickness of employees in a factory over a five-year period.

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2003	30	20	15	35
2004	40	25	18	45
2005	45	30	22	55
2006	50	32	28	60
2007	60	35	30	70

Determine the time series trend using the method of moving averages of order 4. (4 marks)

Construct a graph and on it plot the time series values and the moving average trend values on the same graph. (6 marks)

b) For the table below, find by calculation (using appropriate expression) (5 marks)

Marks	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Frequency	8	10	14	26	20	16	4	2

i) Lower quartile, Q_1

ii) Upper Quartile, Q_3

iii) Quartile deviation

c) A retail sales manager will accept delivery of a large consignment of goods if a random sample of 10 items contains no defectives. If 3% of the producer's total output defective, what is the probability that delivery of a consignment will be accepted? How would the situation change if the random sample were of only 5 items? Give your answer to 4 decimal place. (5 marks)

QUESTION FIVE

a) By using the normal tables find: (5 marks)

i) $P(z < -1.02)$

ii) $P(-1.01 < z < -0.52)$

iii) $P(-0.51 < z < 1.00)$

b) Find the value of P for the following distribution whose mean is 33.2 then compute its standard deviation. Give p as a whole number. (5 marks)

X	8	12	15	P	20	25	30
F	12	16	20	24	16	8	4

c) A sample of 100 fluorescent tubes from the Short Life Tube Company gives a mean length of life of 20.5 hours with a standard deviation of 1.6 hours. Find (a) 95% confidence interval (3 marks)

- d) Two factories are producing visual display units for computers. Use the following sample data to test whether the two production lines are producing units with the same mean life length. (5 marks)

	Mean	Standard deviation	n
Sample 1	20.5	3.4	125
Sample 2	19.0	2.1	180

- e) Draw a graph of positively skewed distribution of data (2 marks)