MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF BUSINESS ADMINISTRATION

………………. YEAR FIRST SEMESTER EXAMINATION FOR

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY

DPS 117: QUANTITATIVE TECHNIQUES

DATE: **TIME:**

INSTRUCTIONS:

Answer Question one and any other two Questions.

QUESTION ONE (COMPULSORY) (30 MARKS)

a)   Quantitative techniques are broadly divided into two main groups. Justify this statement using relevant examples

b)   The following information represents the age (yrs) of residents in a village.

12	36	40	30	28	20	19	10	10	16
19	27	15	26	20	19	7	15	33	21
26	37	6	20	11	17	37	30	20	5

Required;

i)   From the observations, prepare a frequency distribution starting with (5-10) by use of exclusive method.   (10 marks)

ii)   using the table in (i) above calculate the mean age of the residents.   (3 marks)

b)   Discuss four assumptions underlying linear programming.   (4 marks)

c)   A firm estimate that its cost and revenue functions are given by the equations; total cost function: C=300x + 2000. Total revenue function: R=500x-2x^2; where x is the quantity. Determine the quantity that maximizes the profit and the maximum profit. (4 marks)

e) Differentiate the following set of equations;

i $2x^2 - 4x + 2$

ii $\dfrac{x^2-1}{x3}$

QUESTION TWO (20 MARKS)

a) given the quadratic equation y=x2-3x+4. Plot this into a Cartesian plane.(5marks)

b) The table below shows the distribution of heights to the nearest cm of 40 students.

Height (cm)	145-149	150-154	155-159	160-164	165-169	170-174	175-179
Frequency	2	5	16	9	5	2	1

Required

i)   The standard deviation.   (5 marks)

ii)   The quartile deviation.   (5 marks)

QUESTION THREE (20 MARKS)

a)   A car firm hires x Toyota and Y Subaru cars in a day. Atmost 8 cars are hired per day for a total charge of more than Shs 18000. The hire charge per day is Shs 2000 and Shs 3000 for a Toyota and Subaru car respectively.

Required;

i.   Prepare the possible set of linear inequalities to represent the situation.   (5 marks)

ii.   Graph the inequalities and use it to identify atleast 3 sets of possible solutions.

(5 marks)

b)   State and explain the role of quantitative techniques in business and industry.   (5 marks)

c)   Solve the following pair of equations using substitution method.

$$3x + 4y = 24$$
$$4x + 3y = 22$$

QUESTION FOUR (20 MARKS)

a) A company producing stereo receivers has fixed costs amounting to $1650. The variable cost of making a stereo receiver is $150. A stereo receiver is sold at $215. Let x be the quantity produced and sold.

Required;

   i)   The total cost function.   (2 marks)

   ii)   The total revenue function.   (2 marks)

   iii) What is the break even quantity for this company.   (3 marks)

b) Quantitative techniques though offers a great aid to management they cannot be a substitute for decision making. Discuss four limitations of this field of study.   (8 marks)

c) XYZ intends to collect information on the cases of firms affected by computer viruses. Identify two sources of information they can rely on giving relevant examples.   (5 marks)

QUESTION FIVE (20 MARKS)

a) A manufacturer makes two products Q and M. the cost of making 15 units of product Q and 10 units of product M is sh 600. The cost of making 5 units product Q and 8 units of produt M is shs. 340. The manufacturer makes a profit of 20% and 25% on each unit oof product Q and M respectively.

   i.   Express the above cost of making one unit of product Q and M inform of simultaneous equations.   (3 marks)

   ii.   Calculate the cost of making one unit of product Q and M.   (4 marks)

b) Solve the following equation by factorization method.   (3 marks)

$$4x^2 - x - 3 = 0$$

c) Evaluate