



PAN AFRICA CHRISTIAN UNIVERSITY

BACHELORS OF COMMERCE

END OF TERM EXAMINATION

DEPARTMENT: BUSINESS

COURSE CODE: BCM105/DENT0112

COURSE TITLE: QUANTITATIVE TECHNIQUES

EXAM DATE: SATURDAY; 1st AUGUST 2015

TIME: 0830HRS – 1130HRS

INSTRUCTIONS

- Read all questions carefully before attempting.
- Answer **ANY Five** questions.
- Write your **student number** on the answer booklet provided.

QUESTION 1

- a) Define the term quantitative analysis **(3marks)**
- b) Differentiate between discrete and continuous variables **(4marks)**
- c) Explain briefly the meaning of independent and dependent variable as used in quantitative analysis **(4marks)**
- d) With examples, identify and briefly explain any three types of functions used in statistical analysis **(9marks)**

QUESTION 2

- a) Solve for the value of x in the following linear equation
$$3x+21 = 0$$
(2marks)
- b) Use factorization method to solve for the value of Q in the below quadratic equation
$$2Q^2-7Q-9 = 0$$
(6marks)
- c) Use the quadratic formulae to solve for the value of y in the below quadratic equation
$$4y^2-10y+6 = 0$$
(6marks)
- d) Solve for the values of x and y in the following system of equations
$$15x + 10y = 600$$
$$5x + 8y = 340$$
(6marks)

QUESTION 3

- a) Briefly describe the meaning of the following concepts as used in probability theory
 - i. Independent events **(2marks)**
 - ii. Conditional probability **(2marks)**
 - iii. Joint probability **(3marks)**
 - iv. Mutually exclusive events **(3marks)**

- b) Toyota, Tata and Honda companies specializes in manufacturing motor vehicles in for exports to Europe. Toyota Ltd enjoys 70% of the market share, Tata Ltd has 20% market share while Honda Ltd has 10% of the market share.

Research survey in the European market has established that the defects rate for the vehicles manufactured by each company is as follows:

Toyota Ltd - 3%,

Tata Ltd – 6%

Honda Ltd – 9%.

If a vehicle is randomly selected from the European market, determine the probability that it was manufactured by:

- i. Toyota Ltd (1mark)
 - ii. Honda Ltd (1mark)
- c) If the randomly selected vehicle is tested and found defective, determine the probability that it was manufactured by:
- i. Toyota Ltd (4marks)
 - ii. Honda Ltd (4marks)

QUESTION 4

- a) With the help of an example, briefly describe the following types of matrices:

- i. Identity matrix (3marks)
- ii. Square matrix (3marks)
- iii. Null matrix (3marks)
- iv. Transpose matrix (3marks)

- b) Perform the following matrix operations

i. $2 \begin{bmatrix} 6 & 4 \\ 3 & 8 \end{bmatrix} =$

ii. $\begin{bmatrix} 4 & 6 \\ 9 & 5 \end{bmatrix} \times \begin{bmatrix} 7 & 2 \\ 0 & 4 \end{bmatrix} =$

iii. $\begin{pmatrix} 4 & 8 & 4 \\ 6 & 0 & 5 \\ 4 & 6 & 5 \end{pmatrix} + \begin{pmatrix} 8 & 4 & 0 \\ 9 & 10 & 4 \\ 9 & 3 & 12 \end{pmatrix} =$

(8marks)

QUESTION 5

- a) Solve for x, y and z in the below system of equations using the matrix method

$$2x+y-z = 11$$

$$x-2y+2z = -2$$

$$3x-y+3z = 5$$

(12marks)

- b) Briefly explain any four practical applications of quantitative techniques **(8marks)**

QUESTION 6

- a) Differentiate the below function with respect to x

(3marks)

$$y = 4x^3 - 6x^2$$

- b) A hotel charges different prices for the same service in two different markets. The demand function in each market is given by the respective equations:

$$P_1 = 50 - 4Q_1$$

$$P_2 = 80 - 3Q_2$$

Where P is the price per unit and Q is the quantity

The hotel's cost function is given by the equation:

$$TC = 120 + 8Q$$

For each market,

- i. Write down the marginal revenue and marginal cost **(6marks)**
- ii. Determine the price and quantity at which profit is maximized **(6marks)**
- iii. Calculate the overall profit for the two markets **(5marks)**