THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION COMMUNICATION (DICT)

DIPLOMA IN INFORMATION TECHNOLOGY (DIT)

MODULE I EXAMINATION

APRIL/MAY 2010 SERIES

COMPUTATIONAL MATHEMATICS I

TIME: 2 HOURS

Instructions to Candidates

Answer **THREE** Questions only.
Answer **ALL** Questions in Section **A** and any **TWO** from Section **B.**
Show **ALL** your working.
ALL mobile phones MUST be switched off.

SECTION A :   COMPULSORY (30 Marks)

Question ONE

(a).   Solve for the unknowns

      (i). $x + y = 7$
                $2x + 3xy = 40$

(4 Marks)

      (ii). $8x + 15y = 150$

                $12x - 6y = 160$ **(3 Marks)**

(b).   Find the value of:

      (i). $CSC15°$ **(3 Marks)**

      (ii). $\dfrac{\cos 45°}{\sin 45°}$ **(3 Marks)**

(c).   Simplify

$$\frac{\cos^2 \theta \, \tan \theta}{\sin^3 \theta}$$

(3 Marks)

(d).   Find the inverse of matrix A given:

$$A = \begin{pmatrix} 3 & 5 \\ 1 & 7 \end{pmatrix}$$

(4 Marks)

(e).   Evaluate

$$^{8}C_{2} \times {}^{10}P_{6}$$

(3 Marks)

(f).   How many different ways can be Alphabets of the word "OCCUPATION" be arranged if no repetition is allowed.   **(4 Marks)**

(g).   Find the sum of the first 1000 odd numbers.   **(3 Marks)**

Question TWO

(a). Wachira, Adam and Ouma went shopping at Chibabu Shopping Mall. Wachira bought 3kg of meat, 6kg of sugar and 6 litres of milk, Adam purchased 2kg of meat, 8kg of sugar and 4 litres of milk and Ouma bought 1kg of meat more than Wachira, 4kg of sugar and 2 litres of milk less than Adam's. If each of them paid 1200/=, 1120/= and 1040/= respectively for the items they took. Determine using matrix Algebra the unit cost of the following items.

    (i). Meat **(5 Marks)**
    (ii). Sugar **(5 Marks)**
    (iii). Milk **(5 Marks)**

(b). If $P = \begin{pmatrix} 5 & 1 \\ 2 & 2 \end{pmatrix}$ and $S = \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix}$
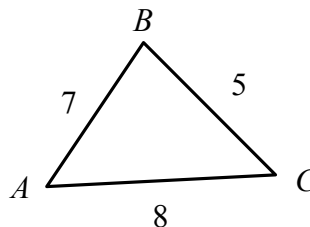
What is the value of $2P = 2P - 35^2$

(5 Marks)

Question THREE

(a). Show that $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$ **(8 Marks)**

(b). Solve the triangle ABC below

(8 Marks)

(c). Show that $\sin 2A = 2\cos A \sin A$ **(4 Marks)**

Question FOUR

(a). In Panja Market there are 6 Goats and 4 Sheeps available for sale. A certain butcher wants to buy 3 animals to slaughter from the 10 available animals. Determine:

    (i). The number of ways the animals can be selected? **(4 Marks)**

    (ii). The number of ways the animals can be selected if at least one must be a goat? **(10 Marks)**

(b).   How many different number plates for cars can be made if each number-plate contains 3 of the digits 0 to 9 followed by a letter A to Z.

    (i).   If no repetition of digits is allowed.   **(3 Marks)**
    (ii).   If repetition of digits is allowed.   **(3 Marks)**

Question FIVE

(a).   A clock strikes the number of times of the hour. How many strikes does it make in one day?   **(5 Marks)**

(b).   Kamau deposited 10,000/= to a bank that pays compound interest at the rate of 5% per annum.

    (i).   Calculate the amount of money he received after 6 years.   **(6 Marks)**
    (ii).   What is the percentage profit he made.   **(3 Marks)**

(c).   Mponda is a courier service van driver. Today he was delayed by some mechanical break down and started his 1000km journey two hours late. If he is to deliver the goods in time, he has to travel at 20km/h faster than his normal speed. What is Mponda's normal speed?   **(6 Marks)**