THE KENYA POLYTECHNIC UNIVERSITY COLLEGE

DEPARTMENT OF INSTITUTIONAL MANAGEMENT

DIPLOMA IN CLOTHING TECHNOLOGY

END OF YEAR I EXAMINATIONS

NOVEMBER 2007 SERIES

MATHEMATICS AND CHEMISTRY

TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATES:

This paper consists of two sections A and B. Section A is Mathematics and Section B is chemistry.

Answer **ALL** questions in Section A part I and any **TWO** in part II.

Answer **ALL** questions in section B.

This paper consists of 4 printed pages

SECTION A: MATHEMATICS

PART I: *Answer all questions*

1. Evaluate: $-21 \times 7 \div (-3) + 16 - 5 \times (-2) + 6.$ (2 marks)

2. Find the LCM and HCF of 60 and 84. (3 marks)

3. Simplify: $2\dfrac{1}{2} - \dfrac{3}{4} \times 1\dfrac{1}{7}$ (2 marks)

4. A car valued at kshs. 450,000 is insured for 85% of its value. Calculate the insured amount. (2 marks)

5. Name three methods of presenting data. (3 marks)

6. An archway to the kitchen of a certain home consists of a rectangular opening topped by a semi-circle. Calculate its area if the width is 90cm and the greatest height is 2m. (3 marks)

7. A rectangular block is 17.5 cm×9.2cm and 5cm thick. Five holes of diameter 1.6cm are drilled through it. Find the remaining volume. (3 marks)

8. Solve for x: $2(2x - 3) - 3(x - 4) = 7.$ (2 marks)

PART II: *Answer any TWO questions*

9. (a) Suppose Jane invested KSH.50, 000 for 7 years in an attractive investment plan offered by a certain insurance company. If the interest rate is 6%, calculate how much her investment will have grown to:
   (i) Using simple interest method
   (ii) Using compound interest method. (6 marks)

   (b) When 24% of the contents of a tea urn are drained away 20.8 liters remain. Find the capacity of the urn and the amount drained. (4 marks)

10. The equation of a line is $y = 3x + 2$. A table of corresponding values is shown below:

X	- 4	- 3	- 2	- 1	0	1	2	3	4
Y		- 7					8		

(a) Complete the table and plot the graph of y against x. Hence find the gradient of the line.   (6 marks)

(b) Find the equation of another parallel line that passes through the point (2,2).   (4 Marks)

11. The table below shows the marks obtained by 400 students in a test.

Marks	1-20	21-40	41-60	61-80	81-100
No. of students	50	100	150	60	40

Construct a table showing the cumulative frequency distribution and draw a graph of the cumulative frequency curve.

Using the graph estimate:

(i)   The median mark

(ii)   The upper and lower quartiles.   (10 marks)

12. (a) Three friends Mary, Esther and John contribute money to start a business. Mary contributes two fifths of the fund, Esther provides two thirds of the remainder and John contributes KSH. 5000. Determine the total fund and the contributions made by Mary and Esther.   (6 marks)

(b) Solve the simultaneous equations below:

$7a + 2b = 47$
$5a - 4b = 1$

                                                                              (4 marks)

SECTION B: CHEMISTRY

13. With examples explain the following terms:

    (a) Inert gases

    (b) Boiling point

    (c) Electronic configuration

    (d) Redox reaction

    (e) Ionic bonding   (10 marks)

14. Exp[lain how the following factors affect the rate of a chemical reaction:

    (a) Concentration

    (b) Catalyst

    (c) Surface area

    (d) Temperature

    (e) Position of an element in the activity series   (10 marks)

15. (a) Aluminium is a metal that is widely used in making household utensils.
       State FIVE properties that make it desirable for its functions.

                                                         (5 marks)

    (b) Using relevant examples, differentiate between thermoplastics and
        thermosetting plastics.   (5 marks)