



**TECHNICAL UNIVERSITY OF MOMBASA**  
**Faculty of Applied & Health**  
**Sciences**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING  
DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 13J)

ACH 2141: CHEMISTRY FOR ENGINEERS

**SPECIAL/SUPPLEMENTARY EXAMINATION**

**SERIES: JULYa\ 2013**

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*

This paper consist of **FIVE** questions

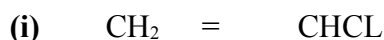
Answer question **ONE (COMPULSORY)** and any other **TWO** questions  
Maximum marks for each part of a question are as shown  
This paper consists of **THREE** printed pages

**Question One (Compulsory)**

- a) Define a paint. (1 mark)
- b) List **SIX** important constituents of paint and give an example of each constituent. (9 marks)
- c) State **TEN** characteristics of a good paint. (10 marks)

**Question Two**

- a) Draw structural section of a polymer that is formed by polymerization of the following monomers.  
Give the name of each polymer that is formed:



- b) List **SEVEN** main ingredients of finished plastic material and state one function of each ingredient. (14 marks)

**Question Three**

- a) State **SEVEN** drawbacks of raw rubber. (8 marks)
- b) Define vulcanization process (2 marks)
- c) (i) Differentiate between a varnish and an enamel (3 marks)  
(ii) State the **THREE** methods by which varnish dries when applied on the surface. (3 marks)
- d) (i) Which are the **FOUR** important constituents of enamels?  
(ii) Give an example of each of the four constituents of enamel (4 marks)

**Question Four**

- a) With help of chemical equation, describe the rusting process of iron. (8 marks)
- b) Calculate the pH values of the following solutions:
- (i)  $10^{-2} \text{H}_2\text{SO}_4$
- (ii)  $10^{-3} \text{Ca}(\text{OH})_2$  (6 marks)
- c) Define (i) A polar molecule  
(ii) Polar bond  
(iii) Covalent bond (6 marks)

### Question Five

- a) Describe the following periodic table trend properties across a particular period and down particular group. Give a reason for your answer.
- (i) Electro negativity
  - (ii) Ionic size (ionic radii)
  - (iii) Atomic size
- (14 marks)**
- b) (I) Write electronic configurations of the following elements in form of s, p, d, f notation.
- (i)  $11^X$
  - (ii)  $17^Z$
- (II) With a reason state their group and period on the p.d. table
- (6 marks)**