



**TECHNICAL UNIVERSITY OF MOMBASA**

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**FACULTY OF APPLIED AND HEALTH SCIENCES**

**DEPARTMENT OF PURE & APPLIED SCIENCES**

**UNIVERSITY EXAMINATION FOR:**

**DIPLOMA IN ANALYTICAL CHEMISTRY**

**DAC 15S**

ACH 2209 : CHEMISTRY OF AROMATIC COMPOUNDS  
SPECIAL SUPPLEMENTARY EXAMINATION

**SERIES: AUGUST 2017**

**TIME: 2 HOURS**

**DATE: Pick Date Sep 2017**

**Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

**Do not write on the question paper.**

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**Question ONE**

(a) Give a reason for each of the following behavior .

(i) Benzene has a boiling point of  $80^{\circ}\text{C}$  and a melting point of  $6^{\circ}\text{C}$  while methyl benzene has a boiling point of  $-21^{\circ}\text{C}$  and melting point of  $-95^{\circ}\text{C}$  (4marks)

(ii) Phenol is more acidic than aliphatic alcohols (4marks)

(b) State Huckels rule of aromaticity. (3marks)

(c) Draw the structures of the following molecules.

(i) 3-chloro methyl benzene. (ii) 4-nitro phenyl amine. (iii)  $\text{SO}_3$  electrophile (6marks)

(d) (i) Define a Diel alder reaction. (2marks)

(ii) Give an example of Diel alder reaction using 1,2 cycloaddition. (4marks)

(e) Naphthalene undergoes oxidation or reduction more readily than benzene but only to the stage where substituted benzene is formed. Explain. (4marks)

(f) State any THREE uses of naphthalene. (3marks)

### Question TWO

(a) Draw the four resonance structures of Anthracene. (8marks)

(b) Explain what happens when a solution of anthracene in xylene is exposed to light. (4marks)

(c) Draw the following structures of naphthalene diozonide. (2marks)

### Question THREE

(a) Write equation for reaction of methyl benzene with the following reagents and name the products.

(i)  $\text{Cl}_2$  in sunlight (ii) (aq)  $\text{KMnO}_4$  (6marks)

(b) Outline the electrophilic substitution mechanism of nitronium ion  $\text{NO}_2^+$  on benzene. (8marks)

(c) Write equation of dissociation of phenol in water. (1mark)

### Question FOUR

(a) Draw the structures of the following heterocyclic molecules. (i) Pyrrole (ii) Azetidine (iii) Azirine

(iv) Pyrazolidine (8marks)

(b) Draw the following molecular structures. (i) Dianthracene (ii) 9,10- anthraquinone. (iii) chloronaphthalene (7marks)

### Question FIVE

(a) Outline synthesis of phenol from benzene. Include equations where possible. (8marks)

(b) Name and draw the product of reaction of naphthalene diozonide and water. (2marks)

(c) (i) Draw structure of phenol and state why phenol is not used as antiseptic. (2marks)

(ii) Name and draw two structures of phenol derivatives that are used as antiseptics. (3marks)