



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN ANALYTICAL CHEMISTRY

DAC 14S

ACH 2209: CHEMISTRY OF AROMATIC COMPOUNDS

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

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.

Question ONE

- (a) (i) Draw the five possible structures of benzene C_6H_6 . (5marks)
(ii) Benzene has m.p.t. of $6^{\circ}C$ while methylbenzene has m.p.t of $-95^{\circ}C$. Explain. (2marks)
- (b) State and explain the two problems that are associated with Kekulé structure of benzene. (6marks)
- (c) Write electrophilic substitution reaction mechanism of naphthalene. (8marks).
- (d) (i) Phenol is a derivative of benzene but it cannot be made by direct reaction of $-OH$ on benzene. Explain. (2marks).
(ii) How can phenol be made from benzene. (7marks).

Question TWO

- (a) Write the four hybrid contributing resonance structures of anthracene. (4marks)
- (b) (i) State Huckel $4n+2$ rule of aromatic compounds. (3marks)
- (ii) Name and draw structures of two Phenol derivatives that are used as antiseptics nowadays. (4marks)
- (c) Explain the reason why Phenol
- (i) is no longer used as an antiseptic. (1 marks)
- (ii) is a stronger acid than aliphatic alcohols. (3marks)

Question THREE

- (a) Explain why phenol is more soluble in NaOH than in water. (6marks)
- (b) How can one distinguish between Benzene and Phenol in the lab using a simple chemical test. (5marks)
- (c) write four resonance structures of naphthalene. (4marks)

Question FOUR

- (a) Naphthalene is more reactive than benzene towards electrophilic attack. Explain (4marks)
- (b) Write equation for reaction of naphthalene with the following reagents and name the Products.
- (i) ozone and then water. (5marks)
- (ii) Hydrogen in Na/ethanol at 351k. (2marks)
- (c) State 4 uses of naphthalene. (4marks)

Question FIVE

- (a) Write equations for synthesis of anthracene from benzene and phthalic anhydride using the following reagents. Name the Intermediates and final products.
- (i) $\text{AlCl}_3/\text{heat}$, $\text{H}_2\text{SO}_4/100^\circ\text{C}$, then Zn (6marks)
- (b) Explain how dimerisation of anthracene occurs. (7marks)
- (c) Write the names of the two structures of sulphonated products of anthracene (2marks)