NATIONAL OPEN UNIVERSITY OF NIGERIA

University Village, Plot 91 Cadastral Zone, Nnamdi Azikiwe Express Way, Jabi - Abuja.

FACULTY OF SCIENCES

DEPARTMENT OF PURE AND APPLIED SCIENCES

JULY 2017 EXAMINATIONS

COURSE CODE: CHM 421 **CREDIT UNIT:** 2
COURSE TITLE: HETEROCYCLIC CHEMISTRY **TIME:** 2 HRS
INSTRUCTION: ***Answer question 1 and any other 3 questions***

1. (a) Describe the Chichibabin-type reaction that quinoline undergoes at temperatures of;
   (i) -70^{o}C (***5 ½ marks)***

   (ii) -45^{o}C (3marks)

   (b) Explain the following reactions as it relates to the formation of 3-substituted indoles.
   I. Sulphonation (2marks) II. Bromination (2marks)
   III. Acetylation (2 ½ marks) IV. Methylation (7marks)

   (c) Write the chemical structures of Flavonone and Isoflavonone. (3marks)

2. (a) Is Warfarin a blood thinner? Explain. (4marks)
   (b) What effect does pH have on Cyanidin? Explain and show the reaction mechanism. (11marks)

3. (a) Describe the Leimgruber-Batcho indole synthesis. (5marks)
   (b) With the aid of a chemical equation, show how indoles are synthesized on a large scale. (5marks)
   (c) Write the chemical structures of Anxin and Melatonin. (5marks)

4. (a) Describe the Conrad-Limpach Synthesis of Quinoline. (5marks)
   (b) Explain in details the Friedlaender Synthesis of Quinoline. Include the reaction pathway. (7 ½ marks)
   (c) Write the chemical structure of Benzopyrylium and Flavylium (2 ½ marks)

5. (a) With the aid of a reaction scheme, discuss how Nicotinic acid can be synthesized from Quinoline. (11marks)

(b) Write the structure of Papaverine. (4 marks)