



NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF PURE & APPLIED SCIENCES
APRIL/MAY, 2019 EXAMINATIONS

CHM 421 HETERO CYCLIC CHEMISTRY (2 Units)

Instruction: answer question 1 and any other three questions

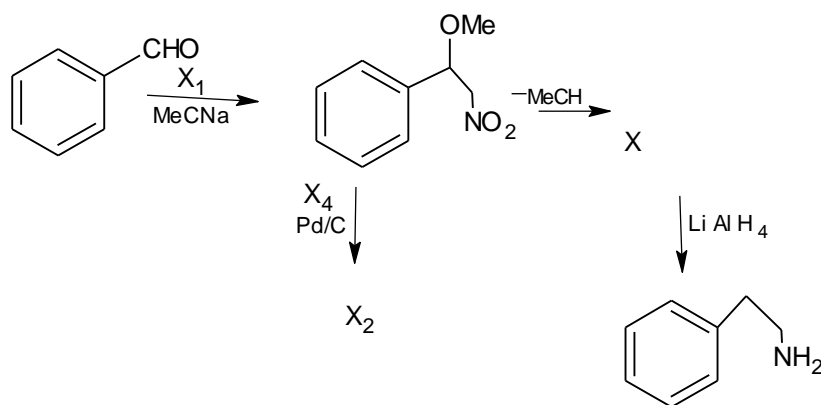
Time allowed 2 hours

Q1

- (a) Give brief description of quinolones (6 marks)
- (b) (i) State five physical and chemical properties of quinolone (5 marks)
- (ii) Write the scientific name of chloroquine (1 ½ marks)
- (iii) Give the structure of the following:
 benzopyrylium , flavylium and flavone (1 ½ marks)
- (c) Show how quinolones undergo electrophilic substitution reaction with any two of the followings.
 - i. Acetyl nitrate (4 marks)
 - ii. Fuming nitric acid (4 marks)
 - iii. Acyl and alkyl halide (3 marks)

Q2.

- (a) Identify the five methods that can be used in the synthesis of quinolones. (5 marks)
- (b)(i) impute the missing conditions and intermediate in the synthesis of β -phenylethylamine below: (3 marks)



- (ii) What is the advantage of modified Pomeranz-Fritsch synthesis? (3 marks)

(b) State four uses of chloroquine **(4 marks)**

Q3

(a) Write short note on the following:

- i. Structure of nicotinic acid **(3 marks)**
- ii. Uses of nicotinic acid **(1 mark)**
- iii. Synthesis of nicotinic acid oxidation of quinolone **(2 mark)**

(b) Describe the following reaction of isoquinoline:

- i. Reduction of isoquinoline **(3 ½ marks)**
- ii. Reaction of isoquinoline with nucleophiles **(1 mark)**

(c) (i) List three methods of synthesizing isoquinoline **(1 ½ mark)**

(ii) briefly discuss the use of isoquinoline in management of Parkinson disease **(3 marks)**

Q4

(a)

(i) What is an indole? **(3 ½ marks)**

(ii) Highlight the physical properties of an indole **(1 ½ mark)**

(iii) Write short note on the oxidation of indole **(3 marks)**

(b) Discuss the uses of amiodaron and serticonazole **(7 marks)**

Q5

Raloxifene (1) is an oral selective estrogen receptor modulator (SERM) that has estrogenic actions on bone and anti-estrogenic actions on the uterus and breast. It is used in the prevention of osteoporosis in postmenopausal women.

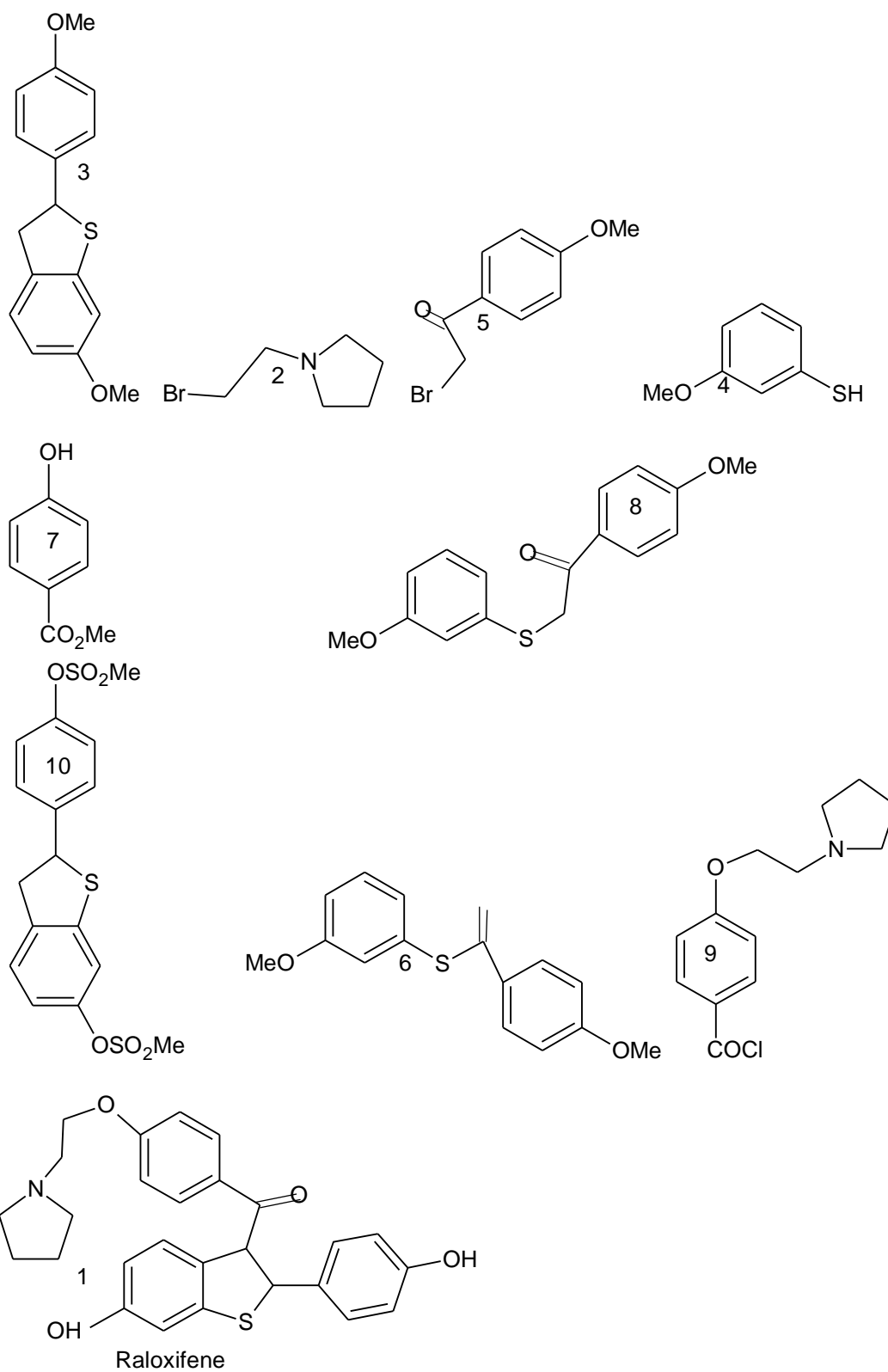
Use the structure 1-10 to answer the following questions.

(a) (i) What is the empirical formula of raloxifene **(3 marks)**

(ii) If compound X is added to compound 7 and the product is compound 9 identify X.

consider the equation below:
$$7 \xrightarrow[\text{SOCl}_2]{\text{X, NaOH}} 9$$
 (3 ½ mark)

(iii) use compounds 4, 8, and 5 to synthesize compound 6; provide your answer in numerical notation. **(3 ½ mark)**



(b) Highlight the structural difference between coumarins and chromones (5 marks)