



Chemistry Department  
Faculty of Science  
Benha University

Chemistry of heterocyclic compounds  
412 Chem.  
4<sup>th</sup> year students

Time: 2 hrs  
18<sup>th</sup> January 2017

الإجابة النموذجية لامتحان الكيمياء العضوية الحلقية الغير متجانسه  
٤١٢ ك

الزمن: ساعتان (٤٨ درجة)

ورقة امتحانية كامله - ساعتان

الفرقة : الرابعه

الشعبة : الكيمياء

التاريخ : مساء الأربعاء ١٨ / ١ / ٢٠١٧

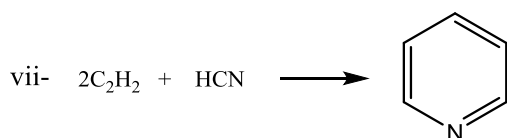
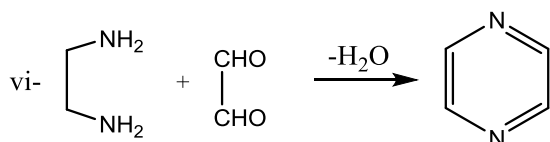
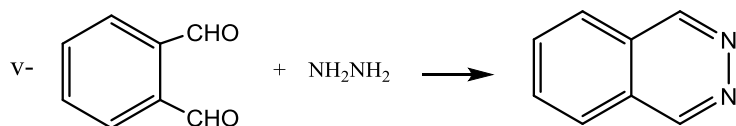
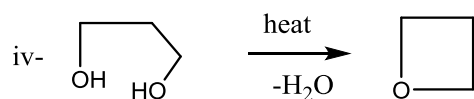
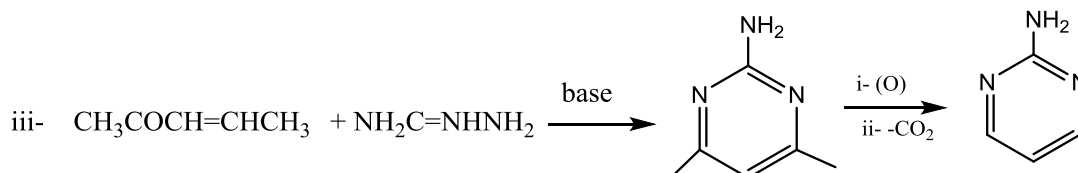
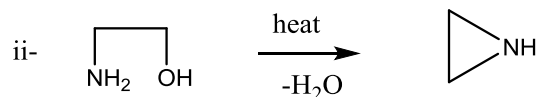
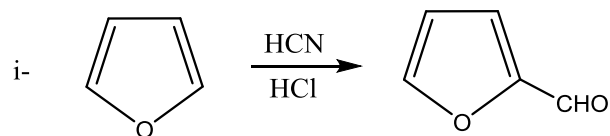
الممتحن : د/ محمد سيد عبد الرحمن سيد بحالو

قسم : الكيمياء

كلية : العلوم

**Answer the following questions:**

1- How can you prepare the following compounds, **select only six:** (6x2 Marks)



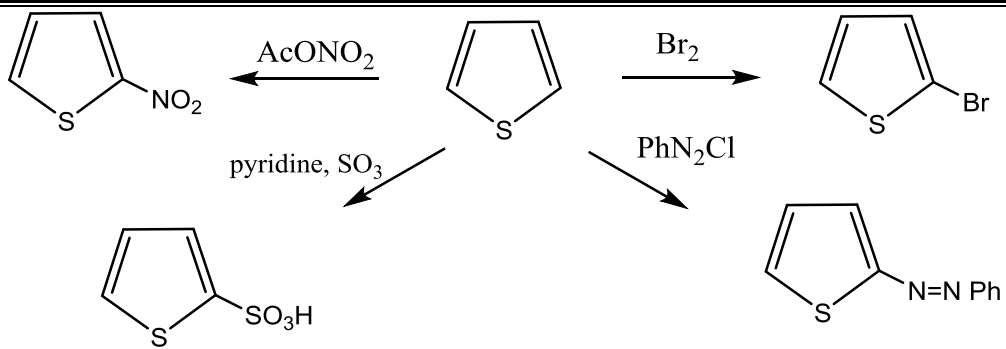
**2- A (2x3 Marks)**

i- Pyrrole is less basic than pyridine and pyridine is less than piperidine because lone pair in nitrogen of pyrrole share in aromaticity but in pyridine and piperidine is available

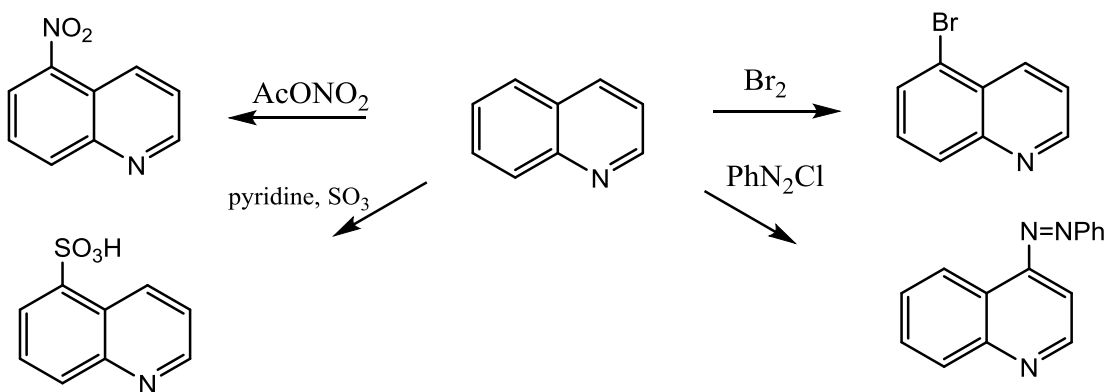
Piperidine is saturated and secondary amine

ii- Electrophilic substitution in thiophene take place in position 2 and 5 while in quinoline at position 5 and 7

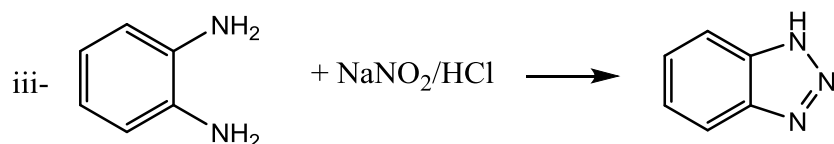
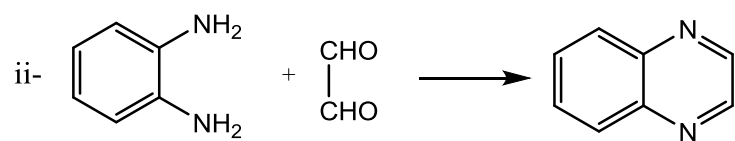
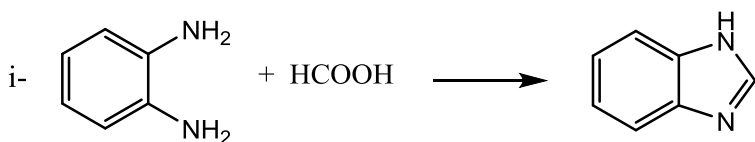
Thiophene



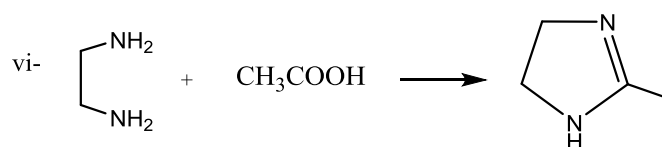
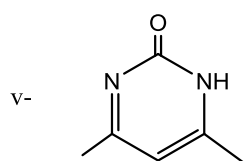
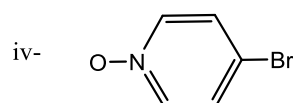
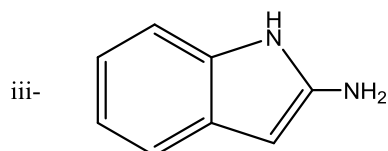
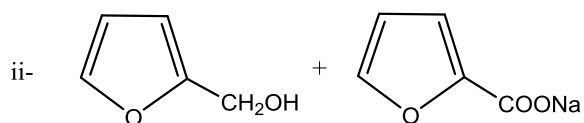
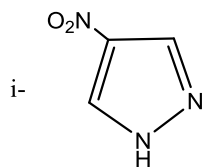
### Quinoline



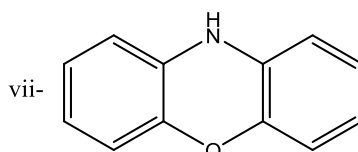
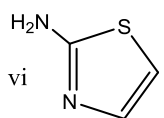
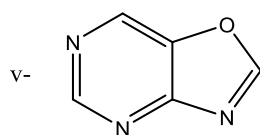
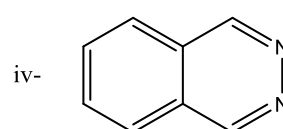
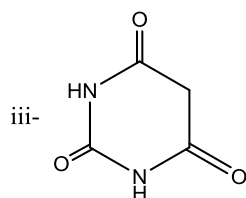
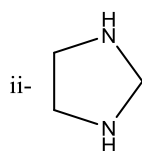
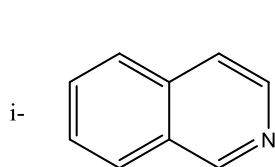
### 2B- (3x2 Marks)



### 3- (6x2 Marks)



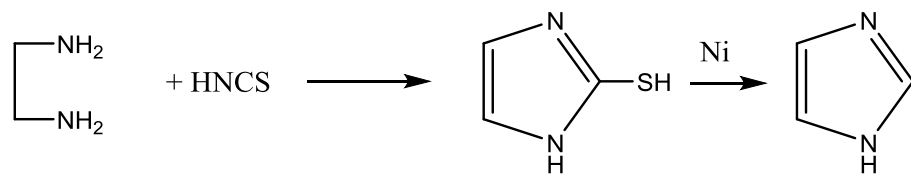
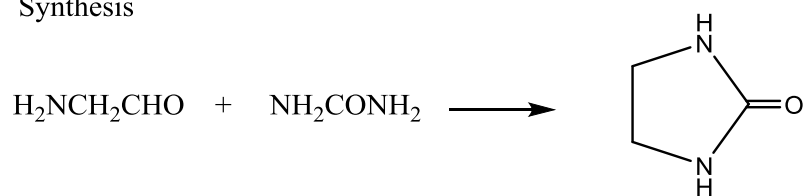
### 4- A (6x1 Marks)



### 4B (6 Marks)

- Imidazole derivatives can be synthesized from the reaction of 2-aminocarbonyl compounds with HNC<sub>2</sub>S or from the reaction of ethylene diamine with urea or carboxylic acids.
- Electrophilic substitution like nitration, sulphonation, halogenations of imidazole take place at position 4 and nucleophilic substitution at position 2

## Synthesis



## Chemical properties

