



EASTERN UNIVERSITY, SRI LANKA

SECOND YEAR FIRST SEMESTER EXAMINATION IN SCIENCE-2016/2017

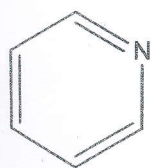
(October/November 2018/January 2019)

CH204 REACTION MECHANISM AND AROMATICITY

Answer all questions

Time Allowed: One hour

1 a) Use the following list of compounds to answer the questions given below:



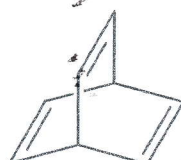
A



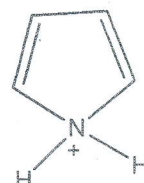
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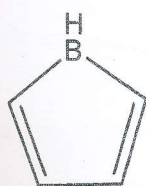
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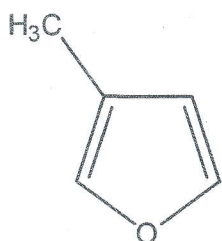
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E



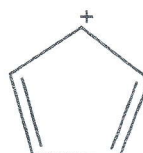
F



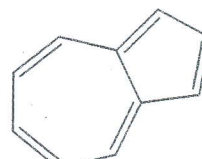
G



H



I



J

Select the compound that is best described as:

- A neutral, 4 pi-electron, anti-aromatic system.
- A 6 pi-electron, aromatic system.
- An aromatic system having  $n=2$  in the Huckel  $4n+2$  rule.
- A non-aromatic, conjugated 6 pi-electron system
- A non-conjugated hydrocarbon.

Contd...

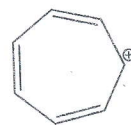
vi) Non-aromatic as drawn, but if H- were removed would give an aromatic cation.

vii) Non-aromatic as drawn, but has an important resonance structure that is aromatic.

viii) Non-aromatic as drawn but has an aromatic conjugate base.

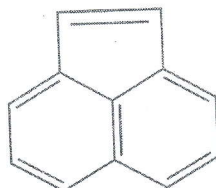
(30 Marks)

b) Explain whether the molecules given below have resonance, aromaticity, both, or neither.



(20 Marks)

c) Using Craig rule, find out whether the following compounds are aromatic or not.



(15 Marks)

d) Discuss the aromaticity of following compounds using the Polygon and Circle method.

i) Cyclooctatetraene

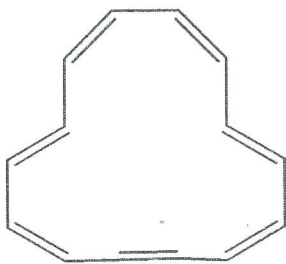
ii) Cyclooctatetraene dianion

iii) Cyclooctatetraene dication

(15 Marks)

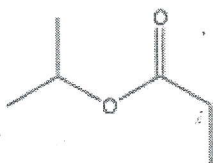
Contd.

- e) The following *Cyclotetradeca-1,3,5,7,9,11-hexaen-13-yne* is an aromatic compound. Do you agree with this statement? Give reasons to *justify* your answer.



(20 Marks)

- 2 a) Predict the product when this compound undergoes a Claisen condensation.

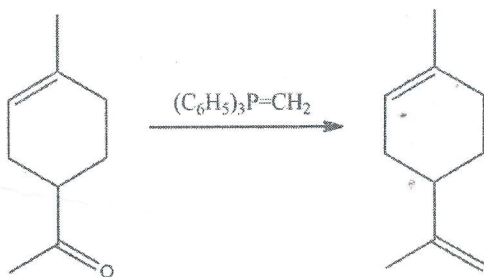


(20 Marks)

- b) *Propose* a plausible mechanism for the Perkin condensation that takes place when benzaldehyde reacts with propanoic anhydride in the presence of potassium propanoate.

(20 Marks)

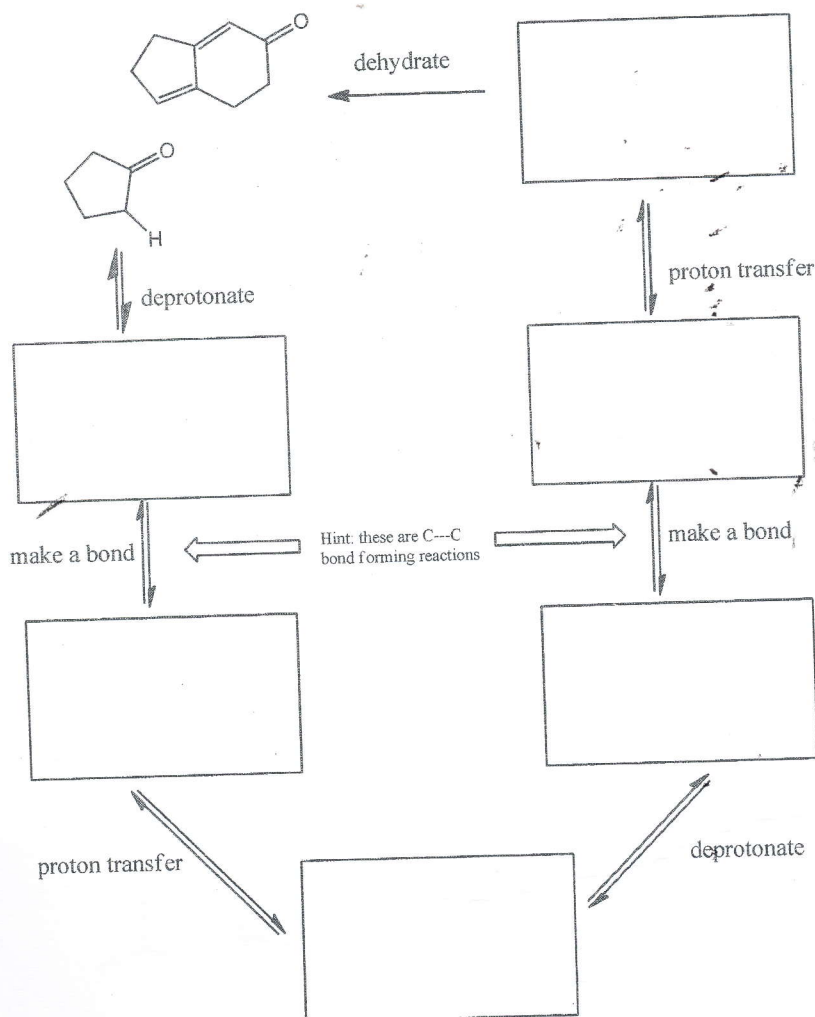
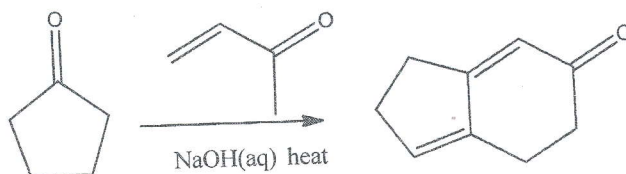
- c) *Write* a possible mechanism for the reaction.



(10 Marks)

*Contd...*

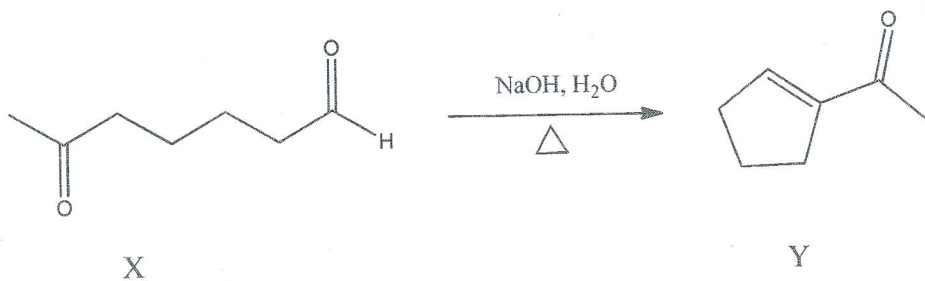
d) i) *Propose* a suitable mechanism for the following transformation. *Show* all important flows of electrons, charges and intermediates. *Draw* the intermediates where indicated.



(30 Marks)

Contd.

ii) Heating of compound X with sodium hydroxide in water led to isolation of the cyclic product Y. Write a detailed mechanism that explains the conversion of X to Y.



(20 Marks)

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