

04

THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF BASIC SCIENCES



BACHELOR OF PHARMACY HONOURS- LEVEL 04 - 2018/19
BSU4340- PHARMACEUTICAL CHEMISTRY III
NBT 01

DATE: 16th NOVEMBER 2018

DURATION: 1.5 HOURS

TIME: 11.00 a.m. – 12.30 p.m.

REGISTRATION NO:

1. This question paper consists of 12 pages with 20 Multiple Choice Questions (Part A) and 04 Short Answer Questions (Part B).
2. Please fill the address sheet. (See last page)

IMPORTANT INSTRUCTIONS TO CANDIDATES

- Write your Registration Number in the space provided.
- Answer **ALL** questions.
- **Multiple Choice Questions (Part A):** Indicate answers in the answer sheet provided by placing a cross (X) in **INK** in the relevant cage.
- Answers in pencil will **NOT** be marked.
- **Short Answer Questions (Part B):** Write answers within the space provided.
- Do not remove any page/part of this question paper from the examination hall.
- Mobile phones and the electronic equipment are **NOT** allowed. Leave them outside.

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REGISTRATION NO:

ANSWER SHEET FOR PART A

Q. No.	(a)	(b)	(c)	(d)
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
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1.20				



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Part A – Multiple Choice Questions

(40 marks)

1. Choose the most suitable answer and indicate with a 'X' in the answer sheet provided.

1.1 Which of the following statements is not correct regarding benzene?

- a) Each C atom is sp^2 hybridized
- b) The C_6 ring is planar
- c) The reactivity of the benzene reflects the presence of carbon-carbon double bonds
- d) Benzene undergoes electrophilic substitution reactions with reactive electrophiles

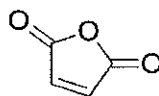
1.2 Which of the following dienophiles is the most reactive with buta-1, 3-diene?



a)



b)



c)



d)

1.3 Which of these conditions is not a requirement for aromaticity?

- a) Planarity
- b) $(4n) \pi$ electrons
- c) Cyclic
- d) $(4n + 2) \pi$ electrons

1.4 The hybridization of the central carbon in $CH_3C \equiv N$ is

- a) sp^2
- b) sp
- c) sp^3
- d) Correct answer is not given

1.5 When considering electrophilic aromatic substitution reactions, electron withdrawing substituents (e.g. nitro) are described as,

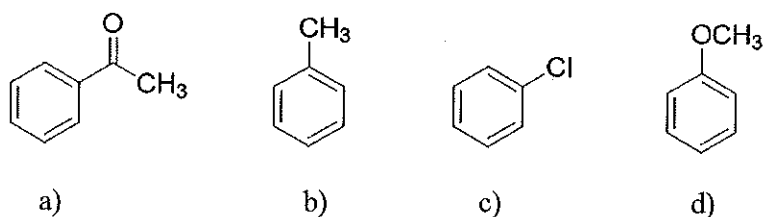
- a) *Ortho/para* directing and activating
- b) *Ortho/para* directing and deactivating
- c) *Meta* directing and activating
- d) *Meta* directing and deactivating



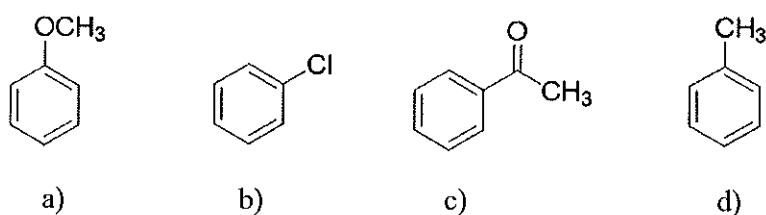
1.6 When considering electrophilic aromatic substitution reactions, the halides are described as,

- a) *Ortho/para* directing and activating
- b) *Ortho/para* directing and deactivating
- c) *Meta* directing and activating
- d) *Meta* directing and deactivating

1.7 Which is most reactive in electrophilic substitution?



1.8 Which gives a *meta* nitro compound as the main product upon nitration with a nitric acid-sulfuric acid mixture?



1.9 Which statement is incorrect about the chlorination of benzene in the presence of AlCl_3 ?

- a) This is an electrophilic addition reaction on benzene
- b) A non-aromatic intermediate is formed
- c) Chlorobenzene is formed
- d) AlCl_3 is acting as a Lewis acid.

1.10 What is the role of H_2SO_4 in the mechanism of the nitration of benzene?

- a) Acts solely as a solvent
- b) Donates a proton to HNO_3
- c) Accepts a proton from HNO_3
- d) Protonates the benzene ring



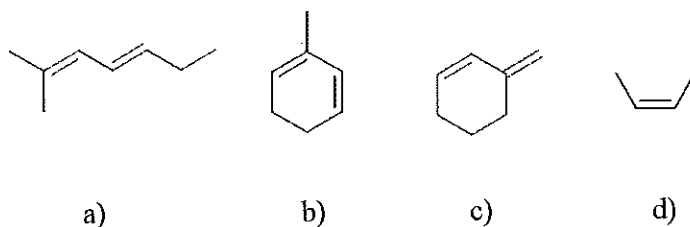
1.11 Which of the following sets of substituents are all activating groups in electrophilic aromatic substitution reactions?

- a) CH_3 , NH_2 , OCH_3
- b) Cl , CN , NO_2
- c) Cl , NH_2 , CH_3
- d) CH_3 , OCH_3 , COCH_3

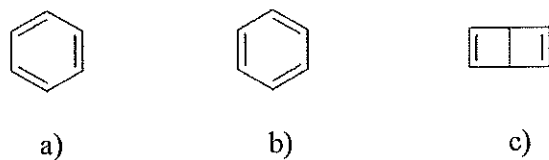
1.12 Which of the following compounds is an isolated diene?

- a) 4-methyl-1,3-heptadiene
- b) 4-methyl-1,4-heptadiene
- c) 5-methyl-2,3-heptadiene
- d) 1,3-cyclohexadiene

1.13 Which of the following is in the *s-cis* conformation?

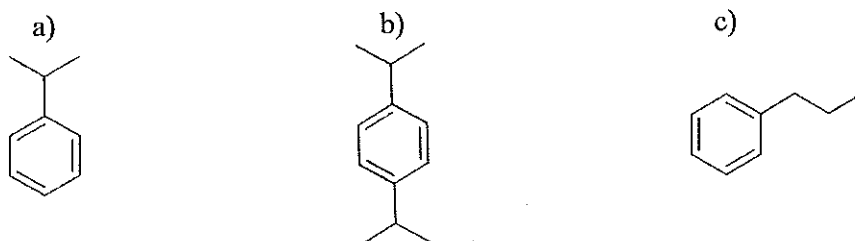


1.14 Which of the following is not a resonance structure for benzene?



d) None of these are valid resonance structures

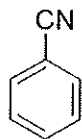
1.15 Which of the following would not be a product from the Friedel-Crafts alkylation of benzene with 1-bromopropane?



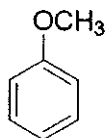
d) a, b and c are all possible products



1.16 Which of the following compounds is predicted to undergo electrophilic nitration the slowest?



a)



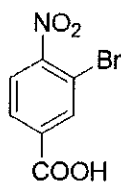
b)



c)

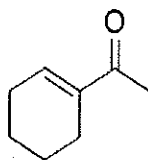
d) all compounds would undergo nitration at the same rate

1.17 What is the IUPAC name of the following compound?

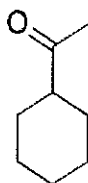


- a) 3-bromo-4-nitrobenzoic acid
- b) 2-bromo-4-carboxynitrobenzene
- c) 2-nitro-6-carboxybromobenzene
- d) 2-bromo-1-nitro-4-benzoic acid

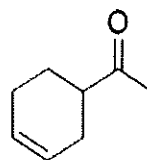
1.18. Which of the following compound has a conjugated system?



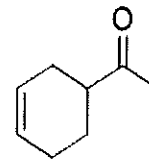
a)



b)

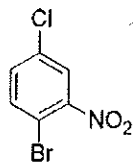


c)



d)

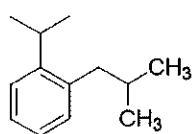
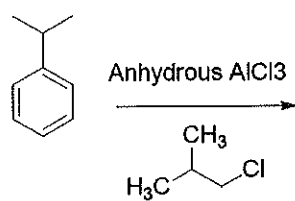
1.19. IUPAC Name of the following aromatic compound is



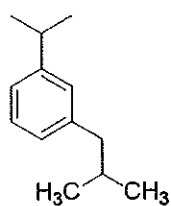
- a) 1-bromo-4-chloro-2-nitrobenzene
- b) 1-chloro-4-bromo-3-nitrobenzene
- c) 2-bromo-5-chloro-2-nitrobenzene
- d) 4-bromo-1-chloro-3-nitrobenzene



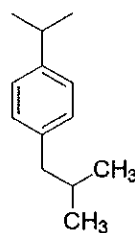
1.20. Identify the major product of the reaction below



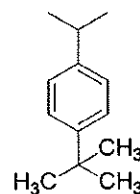
a)



b)



c)



d)



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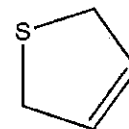
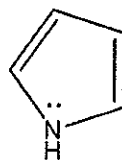
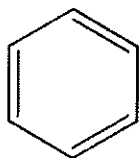
Part B –Short Answer Questions

(60 marks)

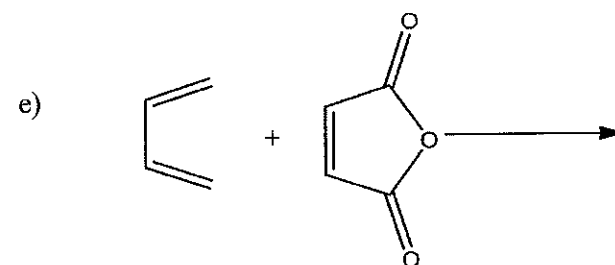
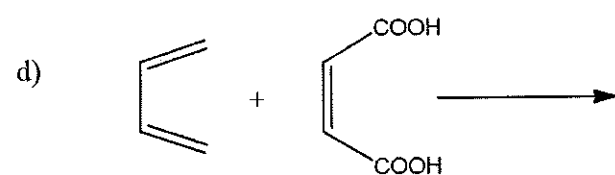
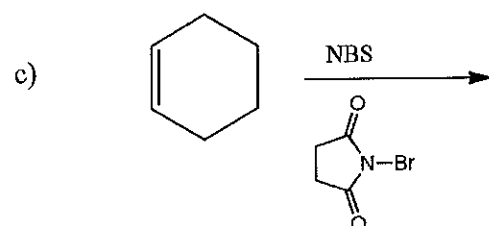
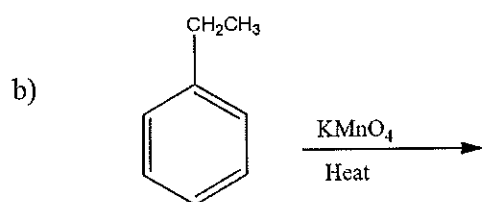
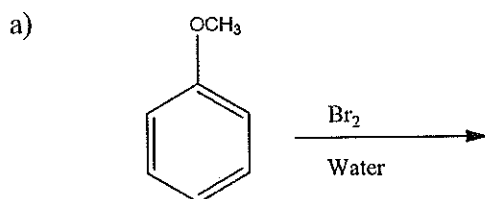
Write answers in the space provided.

- 1 a). Benzene and substituted benzene compounds do not undergo nucleophilic substitution reaction. Comment on the above statement. (07 marks)

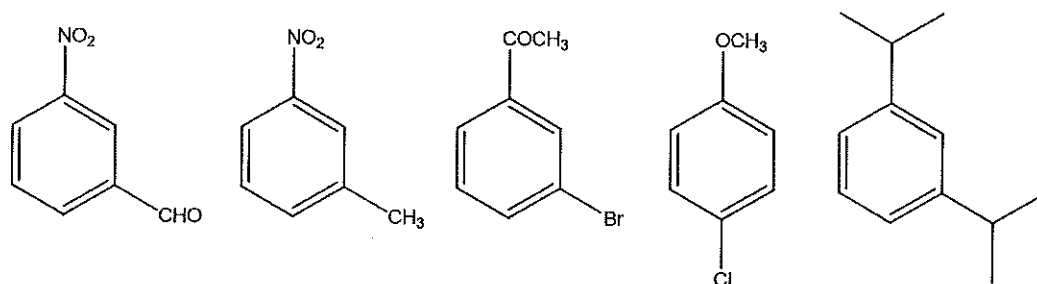
- b). Designate the following compounds as aromatic, anti-aromatic, or non-aromatic. Assume all the molecules given here are planar. (08 marks)



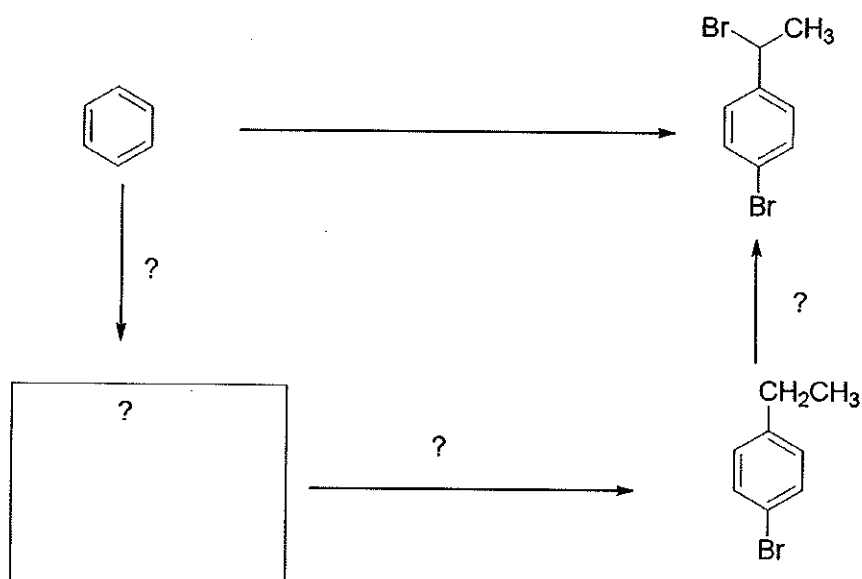
2. Give the structures of the major products of the following reactions. (15 marks)



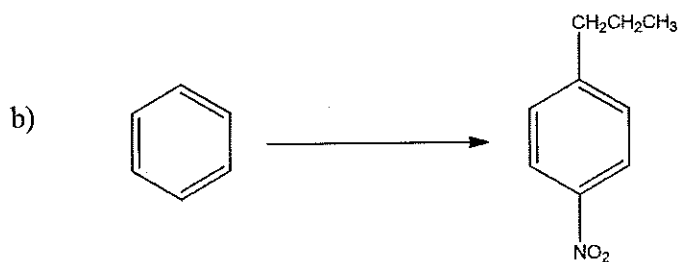
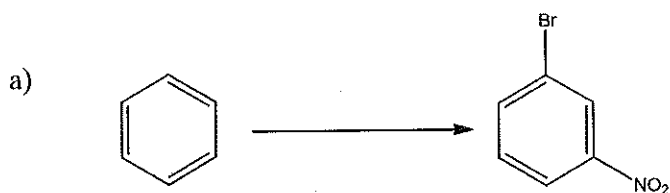
3. a) Indicate by an arrow the position of attack of the electrophile in the major product formed from each of the following compounds. (10 marks)



b) Identify the missing reagents, products, reaction conditions of the following scheme. (08 marks)



4. Giving necessary reagents and conditions, show how you would carry out the following multistep transformations. (12 marks)



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