04

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

BACHELOR OF PHARMACY HONOURS- LEVEL 04 - 2019/20
BSU4340- PHARMACEUTICAL CHEMISTRY III
NBT 01

DATE: 05th FEBRUARY 2020 DURATION: 1.5 HOURS
TIME: 1.30 p.m. – 3.00 p.m.

REGISTRATION NO: .....

This question paper consists of 12 pages with 20 Multiple Choice Questions (Part A) and 04 Short Answer Questions (Part B).

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.
- **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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NBT 01

REGISTRATION NO: .....

ANSWER SHEET FOR PART A

Q. No.	(a)	(b)	(c)	(d)
1.1				
1.2				
1.3				
1.4				
1.5				
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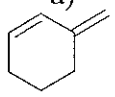
Part A – Multiple Choice Questions

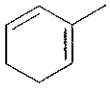
(40 marks)

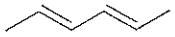
1. Choose the most suitable answer and indicate with a 'X' in the answer sheet provided.

1.1 Which of the following is in the s-cis conformation?

a)

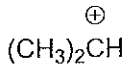




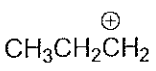


a) b) c) d)

1.2 Which of the carbocation is the most stable?

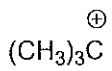


a)



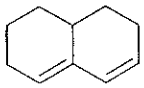
b)

c)

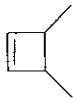


d)

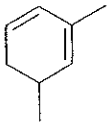
1.3 Which of the following dienes contain conjugated double bonds?



(i)



(ii)



(iii)

(iv)

a) Only i and ii b) Only i and iii c) Only ii and iv d) Only iii

1.4 Which of the following statements is incorrect regarding benzene?

a) Each C atom is sp^2 hybridized.
b) It does not decolorize bromine water.
c) The reactivity of the benzene reflects the presence of carbon-carbon double bonds.
d) Benzene undergoes electrophilic substitution reactions with reactive electrophiles.

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

a) Planarity
b) (4n) π electrons
c) Cyclic
d) (4n + 2) π electrons

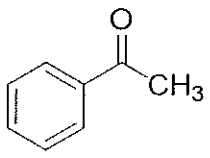
1.6 When considering electrophilic aromatic substitution reactions, electron withdrawing substituents are described as,

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

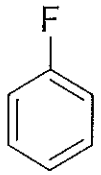
1.7 When considering electrophilic aromatic substitution reactions, the halides are described as,

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

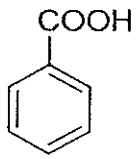
1.8 Which one of the following compounds is most reactive in electrophilic substitution?



a)



b)



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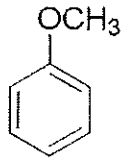
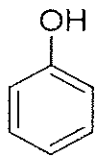
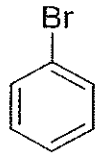


d)

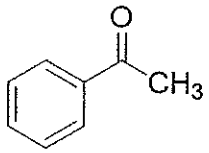
1.9 Which one of the following compounds gives a *meta* nitro compound as the main product upon nitration with a nitric acid-sulfuric acid mixture?



a)



b)



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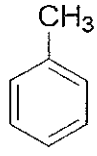


d)

1.10 What is the role of anhydrous $AlCl_3$ in Friedel-Craft acylation?

a) Doesn't involve in the reaction.
b) Provides Cl^- to the medium.
c) Acts as a Lewis base.
d) Acts as a Lewis acid.

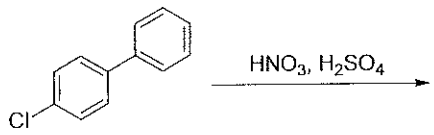
1.11 What is the role of H_2SO_4 in the reaction of the nitration of benzene?

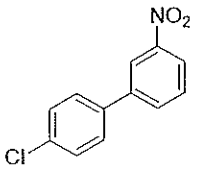
a) Acts solely as a solvent.
b) Donates a proton to HNO_3.
c) Accepts a proton from HNO_3.
d) Protonates the benzene ring.

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

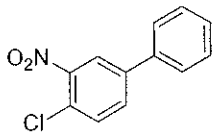
a) CH_3, NH_2, OCH_3
b) Cl, CN, NO_2
c) Cl, NH_2, CH_3
d) CH_3, OCH_3, $COCH_3$

1.13 Identify the major product obtained from the nitration of 4-chlorobiphenyl?

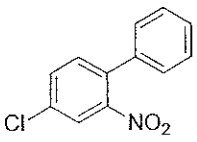




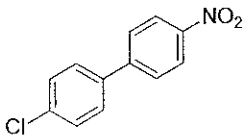
a)



b)



c)



d)

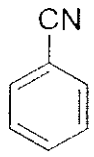
1.14 Which of the following statements is incorrect regarding the electrophilic substitution of benzene?

a) A proton is lost in the final step of the reaction.
b) A non-aromatic intermediate (arenium ion) is formed during the reaction.
c) Benzene acts as the electrophile.
d) Substitution product is aromatic.

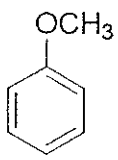
1.15 The hybridization of the central carbon in $H_2C{=}C{=}CH_2$ is:

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

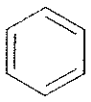
1.16 Which one of the following compounds is predicted to undergo electrophilic nitration the slowest?



a)



b)



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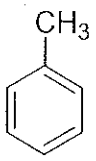
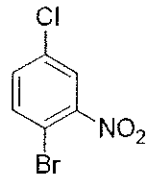


d)

1.17 Identify the major product obtained when aminobenzene (aniline) is treated with excess of bromine water.

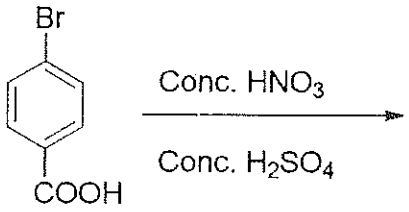
a) *m*-bromoaniline
b) 2,4,6-tribromoaniline
c) *o*-and *p*-bromoaniline
d) 3,5-dibromoaniline

1.18 IUPAC Name of the following aromatic compound is



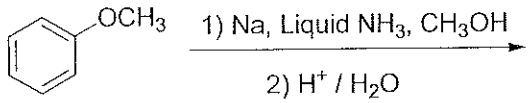
a) 1-bromo-4-chloro-2-nitrobenzene
b) 1-chloro-4-bromo-3-nitrobenzene
c) 2-bromo-5-chloro-2-nitrobenzene
d) 4-bromo-1-chloro-3-nitrobenzene

1.19 Identify the major product of the reaction below.



a) 4-bromo-2-nitrobenzoic acid
b) 4-bromo-3-nitrobenzoic acid
c) 4-bromo-2,6-dinitrobenzoic acid
d) 4-bromo-3,5-dinitrobenzoic acid

1.20 Identify the major product obtained from the reaction given below?



a) b) c) d)

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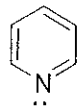
Part B –Short Answer Questions

(60 marks)

Write answers in the space provided.

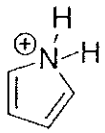
1 a). Benzene does not undergo electrophilic addition reactions. Comment on the above statement. (06 marks)

b). Deduce whether each of the following compounds is aromatic, anti-aromatic or non-aromatic by applying Huckel's rule. Assume all the molecules given here are planar. (08 marks)

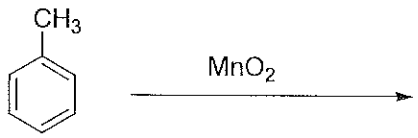
I. 

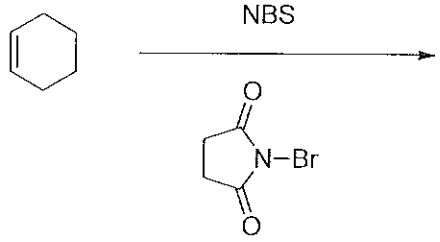
II. 

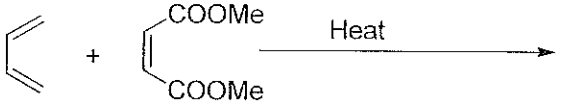
III. 

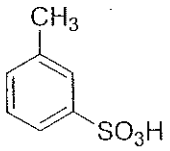
IV. 

2. Give the structures of the major product(s) of the following reactions. (18 marks)

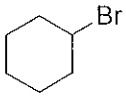
a) 

b) 

c) 

d) 

Con. HNO_3 / Conc. H_2SO_4

e) 


Anhy. $AlCl_3$ / heat

f) 
1) CH_3CH_2Cl / Anhy. $AlCl_3$ / Heat

2) Br_2 (1 mole) / UV light

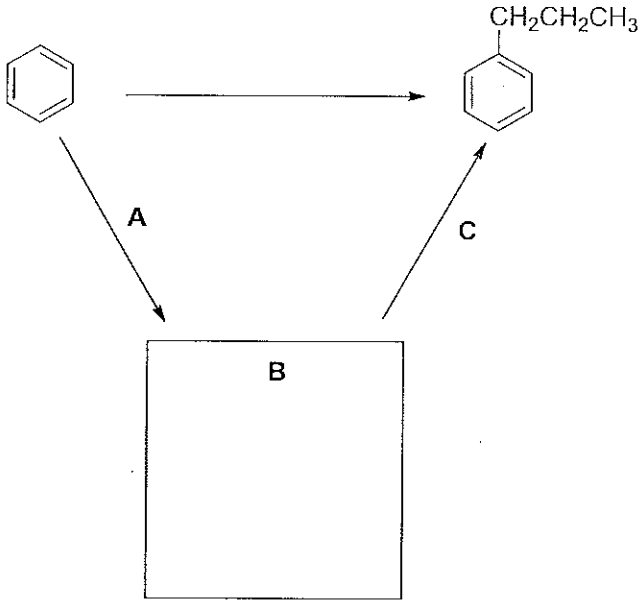
g) 
1) CH_3CH_2COCl / Anhy. $AlCl_3$

2) NH_2NH_2 / KOH / Heat

3. a) Indicate the mechanism and predict the products that you expect when 1,3-cyclohexadiene reacts with DCl (1 equivalent). (10 marks)


DCl

b) Identify the missing reagents, products, and reaction conditions (A, B, and C) of the following scheme. (06 marks)



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

a)

b) 

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Address:.....

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