(13)

SAMPLE

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 II

DATE: 12th March 2020 **DURATION: 1.5 HOURS**
TIME: 11.00 a.m. – 12.30 p.m.

REGISTRATION NO: .....

This question paper consists of 13 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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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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1.19				
1.20				

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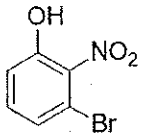
Part A – Multiple Choice Questions

(20 marks)

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

1.1. When phenol is treated with excess of bromine water, it gives
a) *m*-bromophenol
b) *o*-and *p*-bromophenol
c) 2,4-dibromophenol
d) 2,4,6-tribromophenol

1.2. What is the IUPAC name of the following compound?



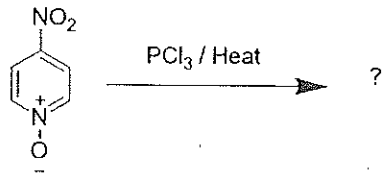
a) 3-bromo-2-nitrophenol
b) 2-bromo-6-hydroxynitrobenzene
c) 2-nitro-3-hydroxybromobenzene
d) 1-hydroxy-2-nitro-3-bromobenzene

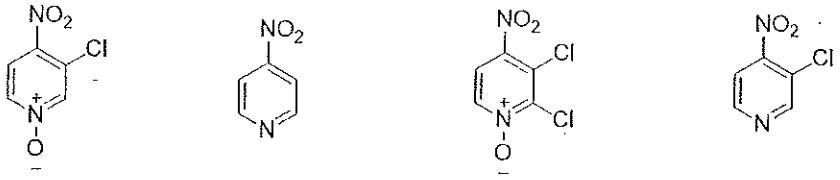
1.3. Which one of the following reagent/s will NOT react with phenol?
a) Br_2 water
b) NaOH
c) $NaHCO_3$
d) Conc. HNO_3/ H_2SO_4

1.4. The 'N' atom in pyridine is
a) sp^3 hybridized
b) sp^2 hybridized
c) sp hybridized
d) None of these

1.5. Which one of the following statements is INCORRECT?
a) The reactivity of pyridine resembles that of a highly deactivated benzene.
b) Pyridine N-oxides are reactive towards both electrophilic and nucleophilic substitutions.
c) Pyridine undergoes electrophilic aromatic substitution easily.
d) Pyridine readily undergoes nucleophilic substitution reactions.

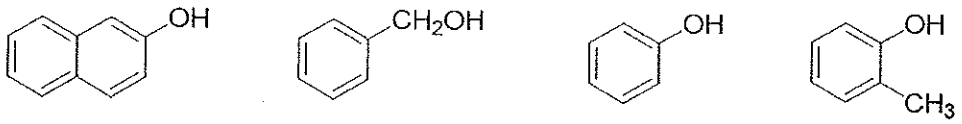
1.6. What will be the major product of the following reaction?





a) b) c) d)

1.7. Which of the following will not give a coloured dye with the reaction of benzene diazonium chloride?



a) b) c) d)

1.8. Which of the following is least basic?

a) b) c) d)

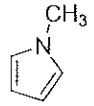
1.9. Which one of the following electrophilic substitution reactions is not possible in pyridine?

a) Friedel-Craft acylation
b) Nitration
c) Sulphonation
d) Bromination

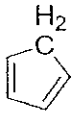
1.10. Which one of the following five-membered heterocyclic compounds is most resonance stabilized?

a) Pyrrolidine
b) Furan
c) Pyrrole
d) Thiophene

1.11. Which one of the following compounds is **NOT** aromatic?



a)



b)

c)

d)

1.12. Which of the following compound is the weakest acid?

a) Phenol
b) *p*-nitrophenol
c) *p*-chlorophenol
d) 3,4-dimethoxyphenol

1.13. Identify the product when aniline undergoes diazotization followed by the attack of H_3PO_2?

a) Aniline
b) Bromobenzene
c) Benzene
d) Phenol

1.14. Pyridine undergoes nucleophilic substitution with phenyllithium at 100□ to produce:

a) 3-phenylpyridine
b) 2-phenylpyridine
c) 3,5-diphenylpyridine
d) Lithium salt of pyridine

1.15. Aryl ethers are more volatile than phenols. This is due to

a) dipolar character of ethers
b) phenols having resonance structures
c) intermolecular hydrogen-bonding in phenols
d) intermolecular hydrogen-bonding in ethers

1.16. The major product obtained on the interaction of phenol with sodium hydroxide and carbon dioxide is
a) salicylaldehyde
b) benzoic acid
c) salicylic acid
d) aniline

1.17. The number of electrons that "N" atom contributes to the π-system in pyridine and pyrrole is;
a) Pyridine 2, Pyrrole 2
b) Pyridine 1, Pyrrole 2
c) Pyridine 2, Pyrrole 1
d) Pyridine 1, Pyrrole 1

1.18. Electrophilic substitution in furan usually occurs at;
a) the C-3 atom
b) the C-2 atom
c) the O atom
d) the C-2 and C-3 atoms

1.19. Porphyrin is a derivative of:
a) pyrrole
b) pyridine
c) tetrahydrofuran
d) thiophene

1.20. Which of the following product is formed when phenol reacts with bromine in CH_2Cl_2 at low temperature?
a) meta-bromophenol
b) para-bromophenol
c) 2,4,6-tribromophenol
d) 4-bromo-2-chlorophenol

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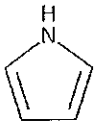
Part B –Short Answer Questions

(80 marks)

Write answers in the space provided.

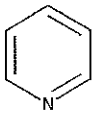
1. Explain the following statements giving reasons. (14 marks)

   a) Pyrrole is more reactive than benzene towards electrophilic substitution reactions.

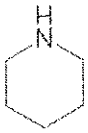


Pyrrole

   b) Pyridine is less basic than piperidine.



Pyridine

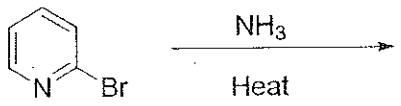


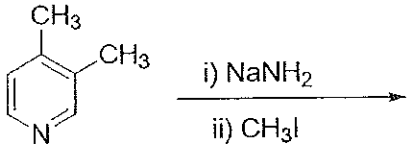
Piperidine

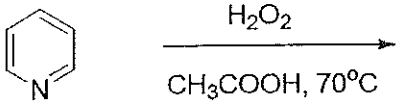
2. a) Arrange the following compounds in the order of increasing pK*a* values. (08 marks)
p-nitrophenol, 2,4-dinitrophenol, 2,4,6-trinitrophenol, phenol, 4-methylphenol

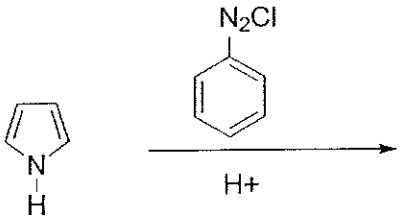
b) Why does an electrophilic substitution take place in the 3rd position of pyridine but not in the 4th position? Explain your answer by providing the necessary resonance structures. (12 marks)

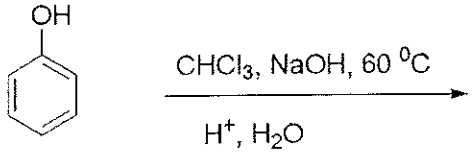
3. Give the structures of the major product/s of the following reactions. (20 marks)

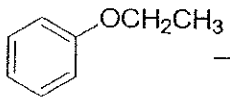
a) 

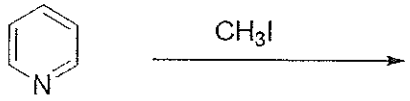
b) 

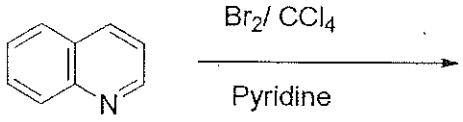
c) 

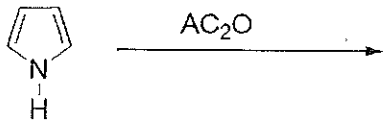
d) 

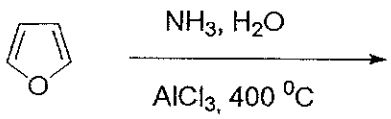
e) 

f) 
OCH2CH3
HI
Heat

g) 
CH3I
N

h) 
Br2/ CCl4
Pyridine
N

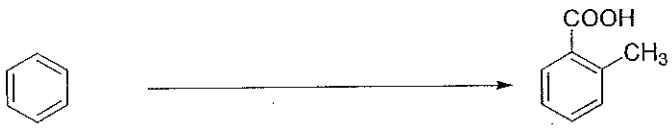
i) 
AC2O
N
H

j) 
NH3, H2O
AlCl3, 400 °C
O

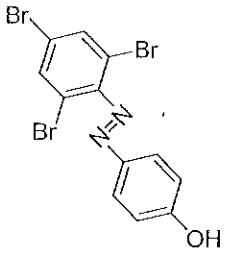
4. Giving necessary reagents and conditions, show how you would carry out the following multistep transformations. (26 marks)

a)

b)



c) 



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