

UNIVERSITY OF JAFFNA, SRI LANKA
FACULTY OF ALLIED HEALTH SCIENCES
first
FIRST YEAR FIRST SEMESTER EXAMINATION IN B.Pharm (Hons) – 2019
PHACH 1173 PHARMACEUTICAL CHEMISTRY I



Date: 23.04.2021

Time: 2 Hours

ANSWER ALL THE FOUR QUESTIONS

1. 1.1 1.1.1 Define Aromaticity. (10 Marks)
- 1.1.2 Write down the Huckel rule for aromaticity. (20 Marks)
- 1.1.3 State whether the following compounds are aromatic or anti aromatic or non aromatic with justification.

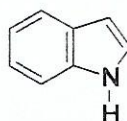
1.1.3.1



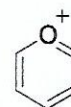
1.1.3.2



1.1.3.3



1.1.3.4



(40 Marks)

- 1.2 1.2.1 List the factors that influence the acidity of organic compounds. (10 Marks)
- 1.2.2 Explain why pKa value of $\text{EtO}_2\text{C}-\text{CH}_2\text{COOH}$ is higher than that of $\text{O}_2\text{N}-\text{CH}_2\text{COOH}$. (20 Marks)

2. 2.1 Define "Chemical Kinetics" (10 Marks)
- 2.2 Briefly discuss the role of kinetics in drug formulation. (30 Marks)
- 2.3 The kinetics of the reaction between sodium thiosulphate (0.1 M) and hydrogen ion (0.1 M) is given in the table.

No.	$\text{S}_2\text{O}_3^{2-}$ (mL)	Acid (mL)	H_2O (mL)	Time (s)
01	15.0	3.0	-	24
02	12.0	3.0	3.0	33
03	9.0	3.0	6.0	45
04	6.0	6.0	-	34
05	6.0	5.0	1.0	37
06	6.0	4.0	2.0	40

- 2.3.1 Determine the order of reaction with respect to $\text{S}_2\text{O}_3^{2-}$. (30 Marks)
- 2.3.2 Determine the order of reaction with respect to H^+ . (30 Marks)
- 2.3.3 Determine the rate of the reaction. (10 Marks)

3. 3.1 Define the followings.

3.1.1 Enantiomer

3.1.2 Diastereomer

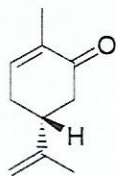
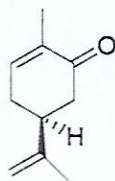
3.1.3 Epimer

3.1.4 Meso compound

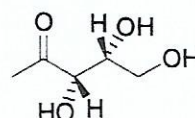
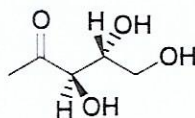
(20 Marks)

3.2 State the stereochemical relationship between the following molecules with justification.

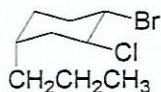
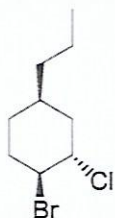
3.2.1



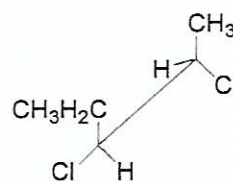
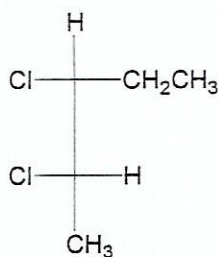
3.2.2



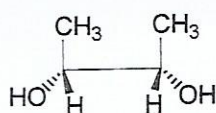
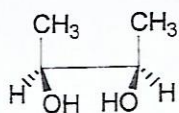
3.2.3



3.2.4



3.2.5



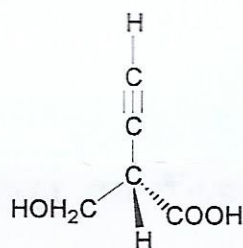
(50 Marks)



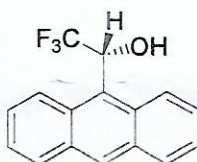


3.3 Assign a configuration, *R* or *S*, to each of the following compounds.

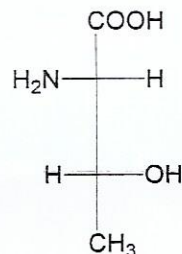
3.3.1



3.3.2



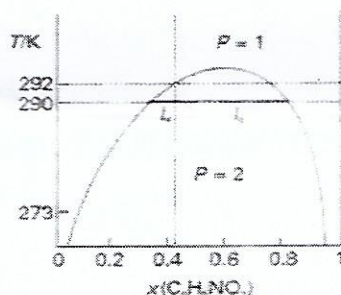
3.3.3



(30 Marks)

4. 4.1 4.1.1 Briefly discuss the temperature-composition phase diagram of a partially miscible liquid. (45 Marks)

4.1.2 A mixture of 50 g of hexane (0.59 mol C_6H_{14}) and 50 g of nitrobenzene (0.41 mol $C_6H_5NO_2$) was prepared at 290 K.



4.1.2.1 What are the compositions of the phases, and in what proportions do they occur? (10 Marks)

4.1.2.2 To which temperature the sample must be heated in order to obtain a single phase? (05 Marks)

4.2 4.2.1 Define entropy. (10 Marks)

4.2.2 Two moles of an ideal gas at 300 K and 6 atm pressure underwent expansion isothermally to half the initial pressure. Calculate the entropy ($R=8.314 \text{ JK}^{-1}\text{mol}^{-1}$) for its expansion under the following conditions:

4.2.2.1 Irreversibly against zero external pressure. (10 Marks)

4.2.2.2 Irreversibly against the 3 atm external pressure. (10 Marks)

4.2.2.3 Reversibly. (10 Marks)