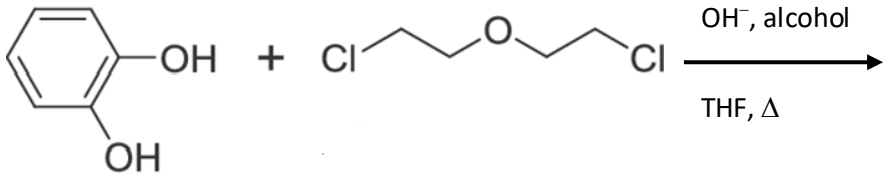
Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, May 2021

Course: Heterocyclic chemistry/ Supramolecular chemistry and carbocyclic rings
Semester: VI
Program: M. Sc. Chemistry **Time 03 hrs.**
Course Code: CHEM 8016 **Max. Marks: 100**

SECTION A

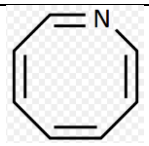
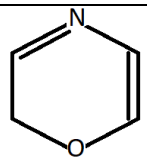
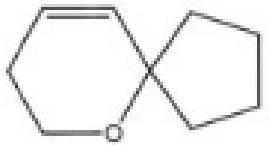
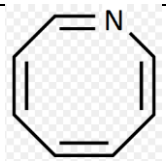
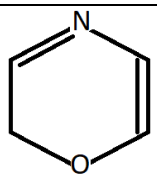
1. **Each question will carry 5 marks**
2. **Instruction: Complete the statement/ Select the correct answer**

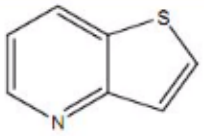
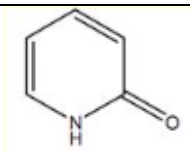
S. No.	Question	Marks	CO
Q 1	(i) Supramolecules are very common in nature, which of the following is an example of a supramolecule? (a) Fructose (b) Glucose (c) Thymine (d) DNA (ii) Interaction between a water molecule and benzene can be called ……. Interaction.	**5**	**CO2**
Q 2	(i) Name the product of the following reaction. catechol, **1** bis(chloroethyl) ether, **2**  	**5**	**CO2**
Q 3	(i) Cavity size of β-cyclodextrin is…….. nm. (ii) Fullerene dissolves in …….. to make a …….. colored solution.	**5**	**CO3**
Q 4	What type of guest would a crown ether be able to bind? (i) Zwitterions (ii) Cations (iii) Anions (iv) Neural molecules	**5**	**CO2**
Q 5	(i) Sometimes we encounter a rotaxane with no stoppers, these molecules are called …….. (ii) A Supramolecular host can possibly bind with which of the following guests? (a) Cation	**5**	**CO2**

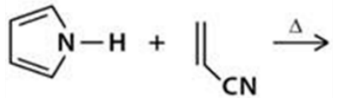
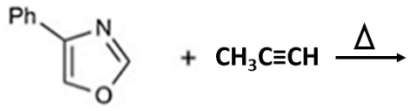
	(b) Anion (c) Neutral (d) All of the above		
Q 6	Which among the following is the strongest base? (a) Pyridine (b) Pyrrole (c) Pyrollidine (d) Piperidine	**5**	**CO1**

SECTION B

1. **Each question will carry 10 marks**
2. **Instruction: Write short / brief notes**

Q 1	(a) Name the following heterocyclic compounds: (i)  (ii)  (iii)  (b) Classify the compounds as aromatic, anti-aromatic or non-aromatic (i)  (ii) 	**6+4**	**CO1**

		(iii) 		
		(iv) 		
Q 2	(a) Explain why? (i) In acridine, the nucleophilic substitution reaction takes place at position-9. (ii) In imidazole, electrophilic substitution does not take place at position-2. (iii) Quinoline gives electrophilic substitution reactions in benzene ring. (b) What are porphyrins. Give an example.		**6+4**	**CO1**
Q 3	(a) What is a molecular switch? Explain the functioning of molecular switch using an example. (b) Explain the difference between endoreceptors and exoreceptors.		**10**	**CO2**
Q 4	(a) In supramolecular chemistry there are interactions other than covalent bonds – justify this statement (b) Using examples explain different forces in supramolecules like hydrogen bonding, metal coordination, Van der Waals forces, pi-pi interactions, and electrostatic effects.		**4+6**	**CO2**
Q 5	(a) Discuss the synthesis of azulenes starting from adipic acid. Show all the steps in the synthesis. (b) How will you prepare indole from phenyl hydrazine. Explain the mechanism also.		**10**	**CO3**
SECTION-C 1. **Each question carries 20 marks** 2. **Instruction: Write long answers**				
Q 1	(a) What happens when (i) Benzofuran reacts with perbenzoic acid. (ii) 2-aminothiazole reacts with bromine in acetic acid at 65°C. (iii) Isoquinoline reacts with methyl bromide.		**10+10**	**CO1**

	(b) Complete the reactions: (i)  (ii)  (iii) $(C_2H_5)_2C(OH)CH_2CH_2Br \xrightarrow{OH^-}$ **OR** (a) Using a suitable example explain what is a molecular machine. (b) What are ferrocene? Explain their electrophilic substitution reactions.	**10+10**	**CO2**