



Question NO. I:

(15 Marks, 30 min.)

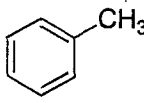
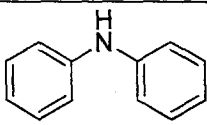
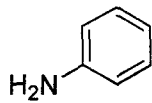
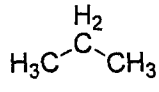
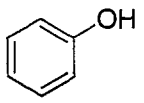
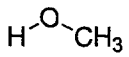
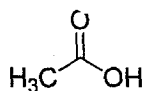

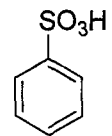
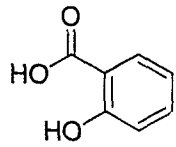
A) Check the following statements with (✓) or (X):

(5 Marks)

✓ or X	No.	Statement
	1	Nucleotides in RNA strand is linked together via phosphate ester linkages.
	2	<div style="text-align: center;"> $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}_2\text{N}-\text{CH}-\text{C}-\text{OH} \\ | \\ \text{CH}_2 \\ | \\ \text{C}_6\text{H}_4 \\ | \\ \text{OH} \end{array}$ </div> <p>Tyrosine, , is an amino acid with hydrophobic side chain.</p>
	3	Oleic acid is a fatty acid which contains an unsaturated aliphatic side chain.
	4	Sugar is considered as long-term energy storage.
	5	Cellulose is a polysaccharide accumulates in the liver of the animal.
	6	<div style="text-align: center;"> $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}_2\text{N}-\text{CH}-\text{C}-\text{OH} \\ | \\ \text{CH}_2 \\ | \\ \text{C}_5\text{H}_3\text{N} \end{array}$ </div> <p>The structure of histadine amino acid is</p>
	7	A coiled structure of a sequence of amino acids known as primary structure protein.
	8	Glucose dissolves in water because the formation of hydrogen bonds.
	9	The oxygen atom in CH_3OCH_3 (dimethyl ether) is considered as electrophilic site.
	10	RNA is composed of a single strand and carries the genetic codes of the cell.

B) Choose the correct chemical name of the following structures located in the answer table: (10 Marks)

Answer Table:

Structure					
Chemical name	.....	.....	.....	.....	.....
Structure					
Chemical name	.....	.....	.....	.....	.....
Choices	phenol – methanol – acetone – aniline – p-toluidine – diphenyl amine – acetic acid – salicylic acid – 1,3,4-trinitrobenzene – acetic acid – benzene sulfonic acid – salicylic acid – toluene – epoxide – butane - propane				

Question NO. II:

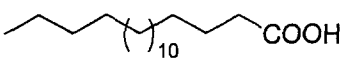
(20 Marks, 30 min.)

A) Complete the missing parts in the following table:

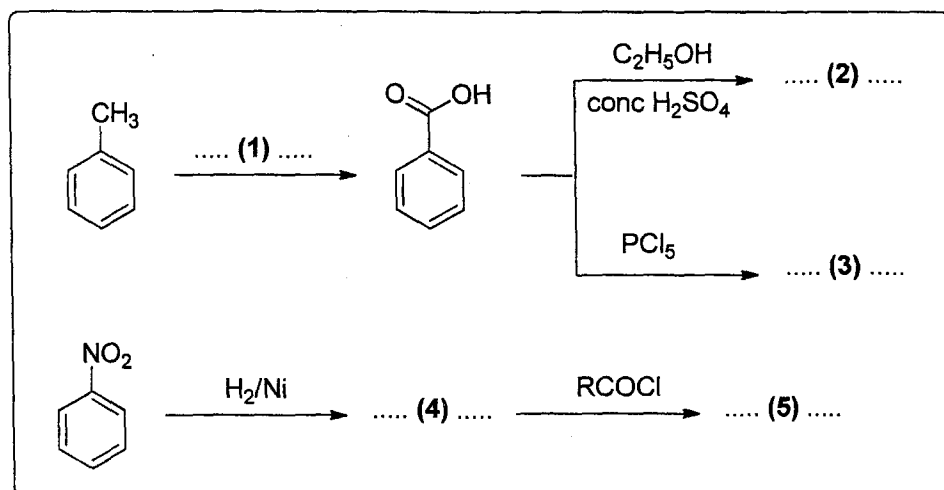
(5 Marks)

complete the answer	Nanomaterials have superior properties than the bulk substances, these properties are:			
	1-			
	2-			
	3-			
	4-			
	The difference in these properties is due to:			
	1-			
	2-			
	Write example(s) of nanoscale materials of the following categories:			
Category	Zero dimension	One dimension	Two dimension	Three dimension
Example(s)	.....	.....	.....	.....

B) Complete the following statements: (10 Marks)

No.	Questions	Answer
1	What is the base in the following equation? $\text{H}_2\text{O} + \text{NH}_3 \longrightarrow \text{HO}^- + \text{NH}_4^+$	.....
2	What is the Lewis base in the following equation? $\text{CH}_3\text{Br} + \text{FeBr}_3 \longrightarrow \text{CH}_3\text{Br}^+ - \text{FeBr}_3^-$	.....
3	What is the most basic anion from the following? a. Cl anion ($\text{pK}_a = -7$). b. acetate anion ($\text{pK}_a = 4.8$). c. Hydroxide ion ($\text{pK}_a = 15.7$). d. Ethoxide ion ($\text{pK}_a = 16.0$).	.....
4	Maltose sugar consists of + sugars.	..... .....
5	The name of the following compound is .....	.....
6	The chemical unit of cellulose polymer is .....	.....
7	Nylon-6,6 is a polymer consists of ..... + .....	..... .....
8	The process used to improve the properties of natural rubber by heating with sulfur is called .....	.....
9	What are the steps of chain polymerization using in chemical polymer synthesis?	..... ..... .....
10	What is the meaning of PVC polymer?	.....

C) In the answer table, draw the structure or the name of the missing parts in the following transformations: (5 marks)



Answer Table:

Question	(1)	(2)	(3)	(4)	(5)
Answer					

Question NO. III:

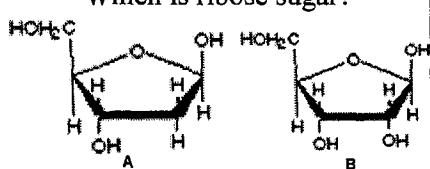
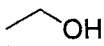
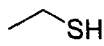
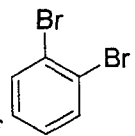
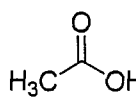
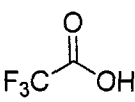
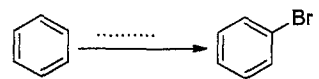
(15 Marks, 45 min.)

A) Complete the missing parts in the following table:

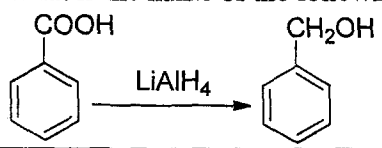
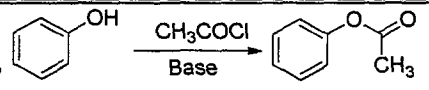
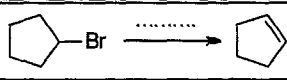
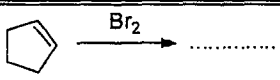
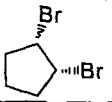
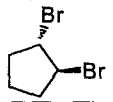
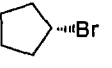
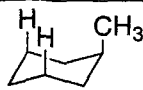
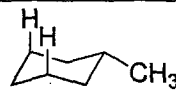
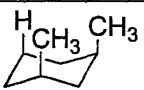
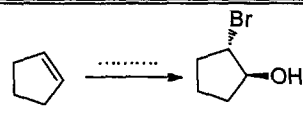
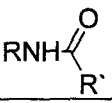
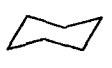






(5 Marks)

	The types of molecular structures of polymers are:			
Types	1)	2)	3)	4)
Draw the structure	.....	.....	.....	.....
Example	.....	.....	.....	.....

B) Choose A or B for questions 1-5 and complete the statements for questions 6-10 from the choices present in the bottom of the table: (5 Marks)

No.	Question	A or B	No.	Statement	Answer
1	Butane is an organic solvent and soluble in? CCl_4 H_2O A B		6	An example of Lewis acid is .....	.....
2	Which is ribose sugar?  A B		7	What is the kind of intermolecular forces between acetone molecules?	.....
3	Which is a hydrophobic amino acid? $\text{H}_2\text{C}-\text{Ph}$ SH $\text{H}_2\text{N}-\text{CHCOOH}$ CH_2 NH_2CHCOOH A B		8	What is the kind of bond in NaCl molecule?	.....
4	Which has higher boiling point?   A B		9	What is the chemical name of	.....
5	Which of the following is higher acidic?   A B		10	What is the suitable reagent used in the following reaction?	.....

C) Complete the following statements from the choices: (5 Marks)

No.	Questions	Answer
1	<p>What is the name of the following reaction?</p>  <p>A Oxidation B Reduction C Alkylation D Acylation</p>	
2	<p>What is name of the reaction in the following equation?</p>  <p>A Acetylation B Hydration C Nitration D Sulphonation</p>	
3	<p>The best condition in the following reaction is</p>  <p>A KOH/C₂H₅OH B KOH/H₂O C H₂SO₄ D No answer</p>	
4	<p>The product in the following conversion is</p>  <p>A  B  C  D No answer</p>	
5	<p>Which is the most stable conformer?</p> <p>A  B  C  D None of them</p>	
6	<p>The best condition in the following reaction is</p>  <p>A Br₂ B Br₂/H₂O C NBS/H₂O D None of them</p>	
7	<p>What is the best reagent in this reaction?</p> <p>RNH₂ + R'COOH $\xrightarrow{\text{.....}}$ </p> <p>A DCC B H₂SO₄ C H₂O D None of them</p>	
8	<p>What is the structure of cyclobutane?</p> <p>A  B  C  D </p>	
9	<p>What is the structure referring to <i>cis</i>-2-butene?</p> <p>A  B  C  D None of them</p>	
10	<p>Ethanol, CH₃CH₂OH, is an organic solvent and considered as solvent.</p> <p>A polar B non-polar C semi-polar D non of them</p>	

With my Best Wishes

Assoc. Prof. Khalid B. Selim