



**Question NO. I:**

**(15 Marks, 30 min.)**

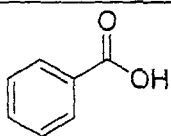

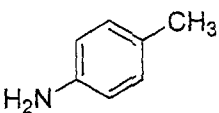
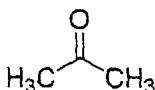
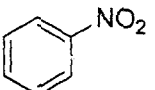
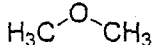
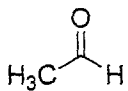
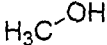
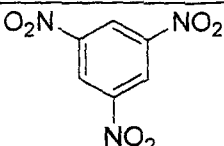
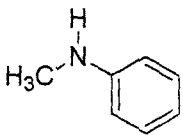
**A) Check the following statements with (✓) or (X):**

**(10 Marks)**

✓ or X	No.	Statement
	1	Nucleotides in DNA strand is linked together via phosphate ester linkages.
	2	<div style="text-align: center;"> <math display="block">\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}_5 \end{array}</math> </div> <p>Phenyl alanine, , is an amino acid with hydrophobic side chain.</p>
	3	Oleic acid is a component in peptides.
	4	DNA is the key component of enzyme synthesis inside the nucleus of a cell.
	5	Glycogen is a polysaccharide accumulates in the liver of the animal.
	6	<p>The structure of serine amino acid is</p> <div style="text-align: center;"> <math display="block">\begin{array}{c} \text{O} \\ \parallel \\ \text{C}-\text{OH} \\   \\ \text{HN} \\   \\ \text{C}_2\text{H}_5 \end{array}</math> </div>
	7	A linear structure of a sequence of amino acids known as secondary structure protein.
	8	Monosaccharide sugar dissolves in water because the formation of hydrogen bonds.
	9	The carbonyl carbon of $\text{C}=\text{O}$ group is considered as electrophilic site.
	10	DNA 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: (5 Marks)**

**Answer Table:**

Structure					
Chemical name	.....	.....	.....	.....	.....
Structure					
Chemical name	.....	.....	.....	.....	.....
Choices	Benzene – acetaldehyde – acetone – N-methyl aniline – p-toluidine – dimethylether – benzoic acid – 1,3,5-trinitrobenzene – 1,3,4-trinitrobenzene – methanol – nitrobenzene – salicylic acid – ethanol – benzaldehyde				

**Question NO. II:**

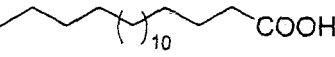
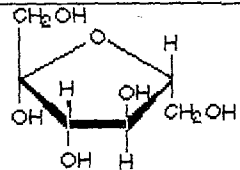
**(15 Marks, 30 min.)**

**A) Complete the missing parts in the following table:**

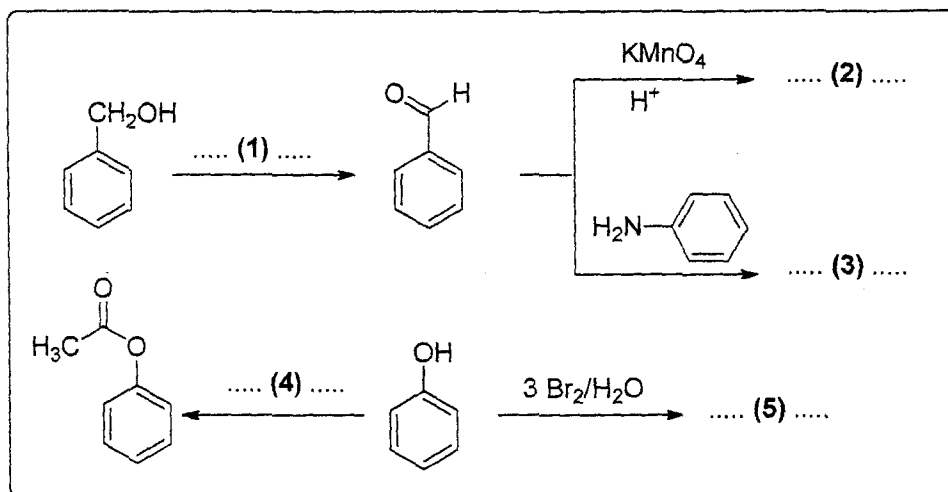
**(5 Marks)**

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: (5 Marks)**

No.	Questions	Answer
1	What is the acid in the following equation? $\text{H}_2\text{O} + \text{NH}_3 \longrightarrow \text{HO}^- + \text{NH}_4^+$	.....
2	What is the Lewis acid 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	Sucrose sugar consists of ..... + ..... sugars.	..... .....
5	The name of the following compound is ..... 	.....
6	The chemical unit of rubber polymer is .....	.....
7	The ..... is a polymer consists of adipic acid + hexamethylene diamine.	..... .....
8	What is the name of the polymer which upon heating, its chemical structure decomposes and cannot be recycled?	.....
9	What is the name of the following sugar? 	.....
10	Mention one use for Endohedral compounds Fullerenes.	.....

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:

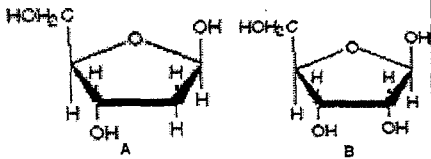
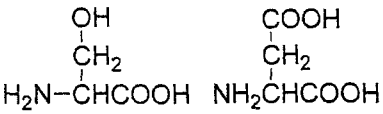
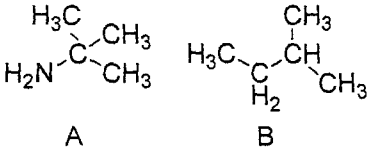
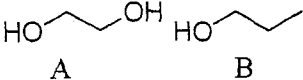
(20 Marks, 45 min.)

A) Complete the missing parts in the following table:

(5 Marks)

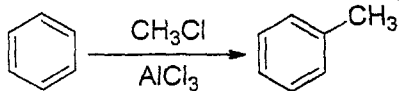
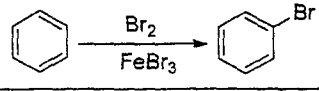
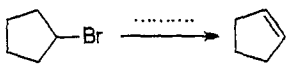
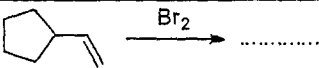
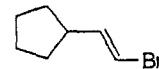
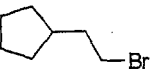
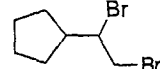
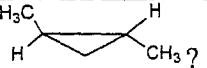
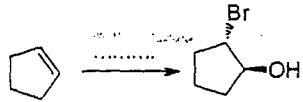
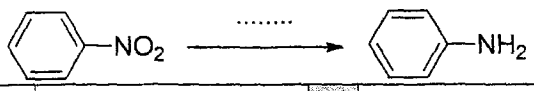
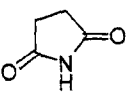
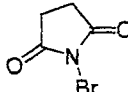
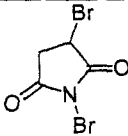
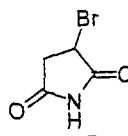
	The types of molecular structures of polymers are:			
Types	1)	2)	3)	4)
Draw the structure	.....	.....	.....	.....
Example	.....	.....	.....	.....

**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: (10 Marks)**

No.	Question	A or B	No.	Statement	Answer
1	Which is polypropylene? $-(CH_2CH_2)_n-$ $-[CH_2CH(CH_3)]_n-$ A                                  B		6	An example of thermoplastic polymer is .....	
2	Which is ribose sugar?  A                                  B		7	What is the kind of Fullerene molecules which contained in carbon nanotubes?	
3	Which is a negatively charged amino acid?  A                                  B		8	What is the meaning of the affinity for electrons or intrinsic ability of an atom to attract the shared electrons in a covalent bond.	
4	Which has higher boiling point?  A                                  B		9	Nucleic Acids are polymers composed of monomer units known as .....	
5	Which of the following has higher boiling point?  A                                  B		10	Hydration reactions add water and break bonds releasing energy and it is the reverse of condensation.	

hydrolysis – Nylon – degradation - peptides - thermoplastic - epoxides - nanowires - nanopeapods – dipole moment  
electronegativity - nucleotides

**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 Halogenation    B Hydration    C Nitration    D Sulphonation</p>	
3	<p>The best condition in the following reaction is .....</p>  <p>A KOH/C<sub>2</sub>H<sub>5</sub>OH    B KOH/H<sub>2</sub>O    C H<sub>2</sub>SO<sub>4</sub>    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 name of the following molecule</p>  <p>A cis-1,2-dimethylpropane    B trans-1,2-dimethylcyclopropane    C cis-1,2-dimethylcyclopropane    D None of them</p>	
6	<p>The best condition in the following reaction is .....</p>  <p>A Br<sub>2</sub>    B Br<sub>2</sub>/H<sub>2</sub>O    C NBS/H<sub>2</sub>O    D None of them</p>	
7	<p>What is the best reagent in this reaction?</p>  <p>A H<sub>2</sub>/Ni    B H<sub>2</sub>NO<sub>3</sub>    C H<sub>2</sub>SO<sub>4</sub>    D HCl</p>	
8	<p>Difference between axial and equatorial conformers is due to steric strain caused by .....</p> <p>A 1,2-diaxial    B 1,2-diequatorial    C 1,3-diaxial    D 1,3-diequatorial</p>	
9	<p>What is the structure referring to NBS?</p> <p>A     B     C     D </p>	
10	<p>Hexane, CH<sub>3</sub>(CH<sub>2</sub>)<sub>4</sub>CH<sub>3</sub>, 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**