Mansoura University
Faculty of Pharmacy
Organic Chemistry
Biomedical Engineering
Code: MTH121

Final Exam 2014/2015
May 25, 2015
Time: 2 hours
Total marks: 50
Total pages: 6

Question NO. I: (25 Marks, 60 min.)

A) Check the following statements with (√) or (X): **(5 Marks)**

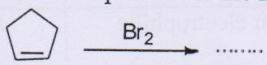
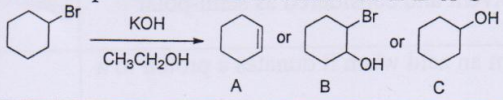
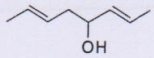
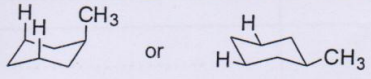
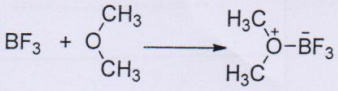
No.	Statement	Answer
1	In alkene, the double bond plays the role of the electrophile.	
2	Rotation around σ bonds is restricted.	
3	Type of the bond that is formed between Na and Cl in NaCl is ionic bond.	
4	Chlorination of benzene is performed in presence of $AlCl_3$ as a Lewis base.	
5	The carbonyl **carbon** (C=O) in ketone may be considered as an electrophilic site.	
6	Compounds with Van der Waals forces have melting points higher than compounds with hydrogen bonding.	
7	In cholesterol, the hydroxyl group is hydrophilic whereas the carbon skeleton is hydrophobic.	
8	Hexane, $CH_3(CH_2)_4CH_3$, is an organic solvent and considered as semi-polar solvent.	
9	Conjugate base is the species formed from an acid when it donates a proton to a base.	
10	Lewis base is defined as electron-pair donors and called electrophile.	

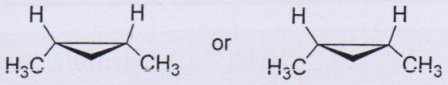
B) Give the scientific term for the following statements: **(10 Marks)**

No.	Statement	Scientific Term
1	The name of the product which forms during the reaction between benzene and a mixture of conc. HNO_3 and conc. H_2SO_4.	.....
2	The compound formed upon the condensation reaction between an alcohol and a carboxylic acid.	.....
3	It is the intrinsic ability of an atom to attract the shared electrons in a covalent bond.	.....
4	The compound formed upon the condensation reaction between an amine and a carboxylic acid.	.....
5	An example of nanomaterials that has 2 dimensions (only length and breadth).	.....
6	Hydration reactions add water and break bonds releasing energy and it is the reverse of condensation.	.....

7	Polymers composed of monomer units known as nucleotides.	.....
8	It is a polymer that turns to a liquid when heated and freezes to a very glassy state when cooled sufficiently.	.....
9	C_{60} molecules by laser vaporization of graphite.	.....
10	A solid particle in the 1-100 nm range that could be non-crystalline, an aggregate of crystallites or a single crystallite.	.....

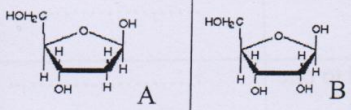
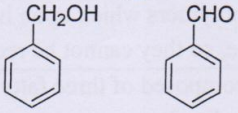
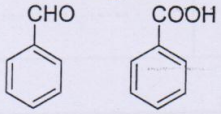
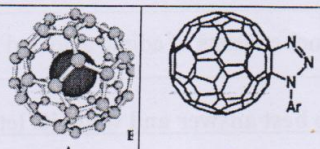
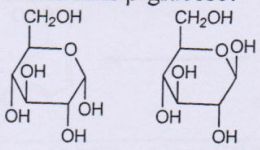
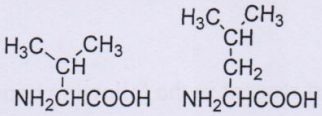
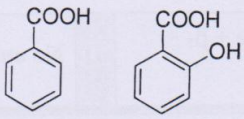
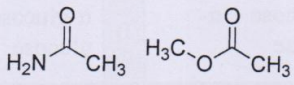
C) Answer the following questions with drawing structures whenever possible: (10 Marks)

No.	Question	Your Answer
1	Draw the product of the following reaction: 	
2	Chloroacetic acid (pKa = 2.86) and 3-chlorobutanoic acid (pKa = 4.0), which is more acidic and why?	The more acidic is .....
3	What is product of this reaction? A or B or C 	
4	What is the total number of σ-bonds and π-bonds in the following compound? 	σ- bonds π-bonds
5	Draw the net result of dipole moment (μ) of SO_2. (By drawing an arrow).	
6	Which compound in the following pair has the highest boiling point? CH_3CH_2CHO or $CH_3CH_2CH_3$ A B	
7	Which is the most stable conformer, A or B?  A B	
8	What is the Lewis acid in the following reaction?  A B C	

9	Which is the trans isomer, A or B?  A or B	
10	Which compound in the following pair has the highest boiling point? CH_3NH_2 or CH_3OH A B	

Question NO. II: (25 Marks, 60 min.)

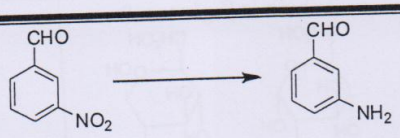
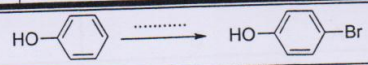
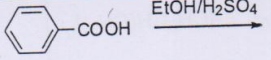
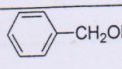
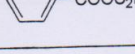
I) Write the correct choice either A or B letter in the answer column (5 Marks)

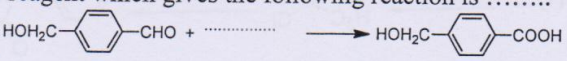
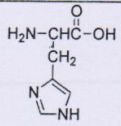
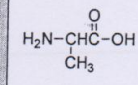
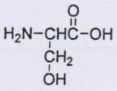
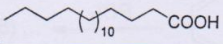
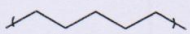
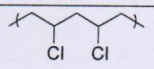
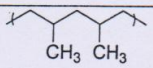
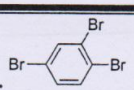
No.	Question	Answer	No.	Question	Answer
1	Which is ribose sugar?  A B		6	Reduction of benzoic acid by $LiAlH_4$ gives:  A B	
2	Oxidation of benzyl alcohol by PCC gives:  A B		7	Which is endohedral fullerene?  A B	
3	Which is β-glucose?  A B		8	Which is a valine amino acid?  A B	
4	Which is salicylic acid?  A B		9	Which is acetamide?  A B	
5	Which is polypropylene? $-(CH_2CH_2)_n-$ $-[CH_2CH(CH_3)]_n-$ A B		10	Which is polyacrylonitrile? $-(CH_2CHCN)_n-$ $-[CH_2CH(C_6H_5)]_n$ A B	

II) Write the suitable scientific terms for the following statements: **(5 marks)**

No.	Statement	Scientific Term
1	Single-walled carbon nanotubes (SWNTs) encapsulating C_{60}.	.....
2	Fullerene cages with encapsulated molecule have many potential applications.	.....
3	The medical use of molecular-sized particles to deliver drugs, heat, light or other substances to specific cells in the human body.	.....
4	A kind of sugar that considered as an animal storage product that accumulates in the liver.	.....
5	The $(4n + 2)\ \pi$ electron rule for aromaticity.	.....
6	A polysaccharide found in plant cell walls.	.....
7	They are polymers which upon heating will chemically decompose, so they cannot be recycled.	.....
8	They are composed of three fatty acids covalently bonded to one glycerol molecule.	.....
9	Specific linear sequence of amino acids a polypeptide.	.....
10	A polymer consists of adipic acid and hexamethylene diamine.	.....

III) Choose the best answer and write its letter in the right column: **(5 marks)**

No.								Answer
1	The best reagent in the following transformation is 							
	A	$FeSO_4/NH_4OH$	B	H_2/Ni	C	$NaNO_2/HCl$	D	No answer
2	Sucrose consists of							
	A	α-glucose + α-glucose	B	α-glucose + β-glucose	C	α-glucose + β-fructose	D	No answer
3	The best condition in the following reaction is ..... 							
	A	Br_2/H_2O	B	Br_2/CS_2, 5 °C	C	Br_2/CS_2, 60 °C	D	No answer
4	The final product in the following conversion is ..... 							
	A		B		C		D	

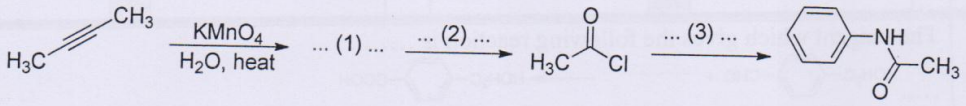
5	β-Maltose consists of						
	A	α-glucose + β-glucose	B	α-glucose + α-glucose	C	α-glucose + β-galactose	D	No answer
6	The reagent which gives the following reaction is ..... 						
	A	$AlCl_3$.	B	$Ag(NH_3)_2NO_3$	C	PCC	D	$KMnO_4$
7	Which of the following is histidine amino acid?						
	A 		B 		C 		D	No answer
8	The following compound is ..... 						
	A	palmitic acid	B	stearic acid	C	oleic acid	D	No answer
9	The chemical unit of PVC polymer is						
	A 		B 		C 		D	No answer
10	The chemical name of the following compound is ..... 						
	A	1,3,4-tribromobenzene	B	1,2,4-tribromobenzene	C	1,2,5-tribromobenzene	D	No answer

IV) Illustrate with drawing the type of the molecular structures of polymers and an example for each type (4 Marks)

Types	Linear	Cross-Linked	.....	.....
Example	.....	.....	polyurethanes	.....
Drawing				

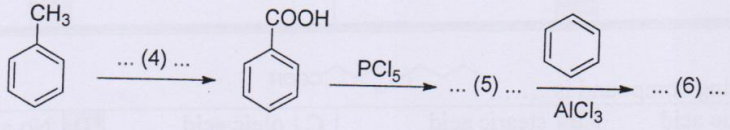
VI) Draw or write the missing parts to complete the following transformations: (6 marks)

1)



	1	2	3
Draw structure or write reagent			

2)



	4	5	6
Draw structure or write reagent			

With my Best Wishes
Dr. Khalid B. Selim

Draft