Model Answer 1

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

Final Exam 2015/2016
December 28, 2015
~~Time: 2 hours~~
Total marks: 50
Total pages: 5

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

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

No.	Statement	Answer
1	In alkene, the triple bond plays the role of the nucleophile.	X
2	The carbonyl **Oxygen** (C=O) in ketone may be considered as an electrophilic site.	X
3	Type of the bond that is formed between O and H in H_2O is ionic bond.	X
4	Bromination of benzene is performed in presence of $AlBr_3$ as a Lewis acid.	√
5	Rotation around π bonds is free.	X
6	Compounds with Van der Waals forces have melting points lower than compounds with hydrogen bonding.	√
7	Lewis base is defined as electron-pair acceptors and called electrophile.	X
8	Ethanol, CH_3CH_2OH, is an organic solvent and considered as polar solvent.	√
9	Conjugate base is the species formed from an acid when it donates a proton to a base.	√
10	In cholesterol, the hydroxyl group is hydrophobic whereas the carbon skeleton is hydrophilic.	X

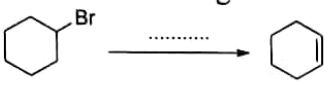
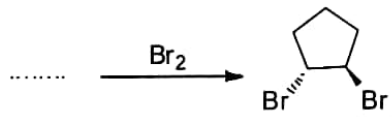
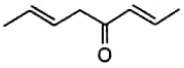
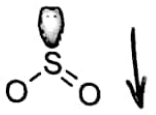
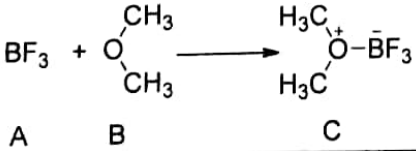
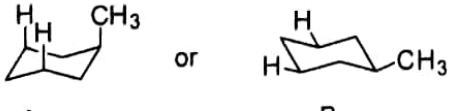
B) Give the scientific term for the following statements: **(10 Marks)**

No.	Statement	Scientific Term
1	The name of the product which forms during the reaction between benzene and a mixture of Cl_2 and $AlCl_3$.	chlorobenzene
2	The compound formed upon the oxidation reaction between a primary alcohol and potassium permanganate.	Carboxylic acid
3	It is the intrinsic ability of an atom to attract the shared electrons in a covalent bond.	electronegativity
4	The compounds formed upon the hydrolysis reaction of an ester in acidic medium.	Carboxylic acid + alcohol
5	An example of nanomaterials that has 3 dimensions (only length, breadth and height).	Nanoparticles
6	Hydration reactions add water and break bonds releasing energy and it is the reverse of condensation.	Hydrolysis

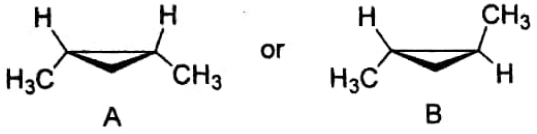
Model Answer

7	Polymers composed of monomer units known as amino acids.	proteins
8	It is a polymer that when heated, will chemically decompose, so it cannot be recycled.	thermosetting plastics
9	Fullerene molecules contained in carbon nanotubes.	Nano pea pods
10	A solid particle in the 1-100 nm range that could be non-crystalline, an aggregate of crystallites or a single crystallite.	nanoparticles

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

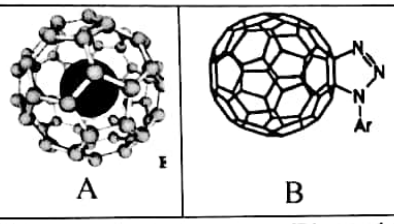
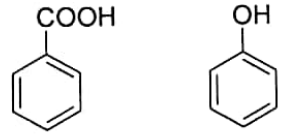
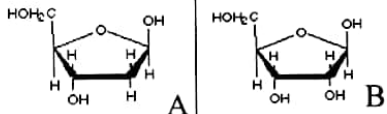
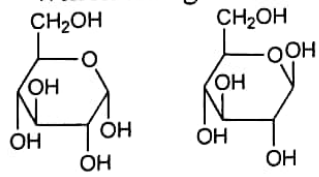
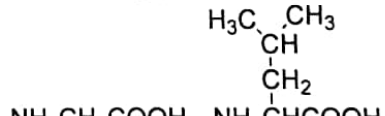
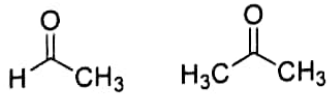
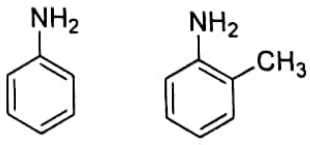
No.	Question	Your Answer	
1	What are the reagents of this reaction? 	KOH/alcohol	
2	Chloroacetic acid (pKa = 2.86) and 3-chlorobutanoic acid (pKa = 4.0), which is less acidic?	The more acidic is Chloroacetic acid	
3	Draw the substrate of the following reaction: 		
4	What is the total number of σ-bonds and π-bonds in the following compound? 	σ- bonds	8
		π-bonds	3
5	Draw the net result of dipole moment (μ) of SO_2. (By drawing an arrow).		
6	What is the Lewis base in the following reaction?  A B C	B	
7	Which is the least stable conformer, A or B?  A B	A	
8	Which compound in the following pair has the highest boiling point? CH_3CH_2CHO or $CH_3CH_2CH_2OH$ A B	B	

Model Answer

9	Which is the cis isomer, A or B?  A or B	A
10	Which compound in the following pair has the lowest boiling point? CH_3NH_2 or CH_3OCH_3 A B	B

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

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

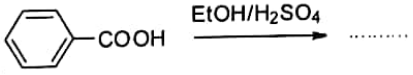
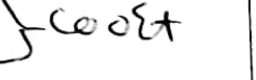
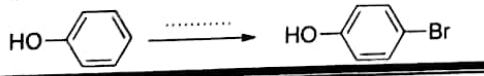
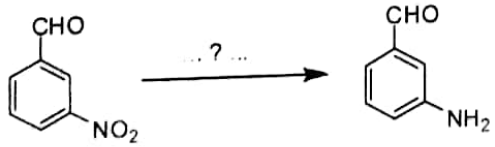
No.	Question	Answer	No.	Question	Answer
1	Which is endohedral fullerene?  A B	A	6	Which oxidizing agent could convert benzyl alcohol to benzaldehyde? PCC DCC A B	A
2	Which substrate (**A** or **B**) could be reduced by $LiAlH_4$ to give benzyl alcohol:  A B	A	7	Which is deoxyribose sugar?  A B	A
3	Which is α-glucose?  A B	A	8	Which is a glycine amino acid?  A B	A
4	Which is acetaldehyde?  A B	A	9	Which is aniline?  A B	A
5	Which is polypropylene? $-(CH_2CH_2)_n-$ $-[CH_2CH(CH_3)]_n-$ A B	B	10	Which is polyacrylonitrile? $-(CH_2CHCN)_n-$ $-[CH_2CH(C_6H_5)]_n$ A B	A

Model Answer

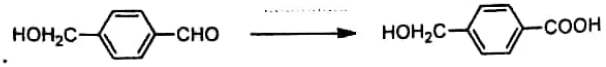
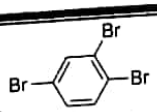
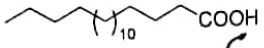
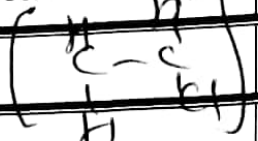
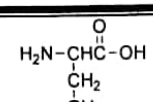
II) Write the suitable scientific terms for the following statements: **(5 marks)**

No.	Statement	Scientific Term
1	A polymer consists of adipic acid and hexamethylene diamine.	Nylon 6.6
2	Fullerene cages with encapsulated molecule have many potential applications.	endohedral buckyballs
3	The medical use of molecular-sized particles to deliver drugs, heat, light or other substances to specific cells in the human body.	Nanomedicine
4	They are polymers which upon heating will chemically decompose, so they cannot be recycled.	thermosetting plastics
5	The $(4n + 2)$ π electron rule for aromaticity.	Huckel rules
6	A polysaccharide found in plant cell walls.	Cellulose
7	A kind of sugar that considered as an animal storage product that accumulates in the liver.	Glycogen
8	They are composed of three fatty acids covalently bonded to one glycerol molecule.	triglycerides
9	Specific linear sequence of amino acids a polypeptide.	primary structure of proteins
10	Single-walled carbon nanotubes (SWNTs) encapsulating C_{60}.	Nanopeapods

III) Choose the best answer and write its letter in the right column: **(10 marks)**

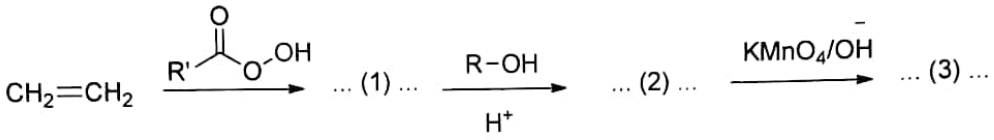
No.		Answer
1	The final product in the following conversion is ..... 	
2	Sucrose consists of ..... + ...	α-glucose + β-fructose
3	The best condition in the following reaction is ..... 	$Br_2/CS_2/0°C$
4	The best reagent in the following transformation is ..... 	$FeSO_4$/ NH₄OH
5	β-Maltose consists of ..... + ...	α-Glucose + β-Glucose

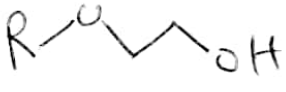
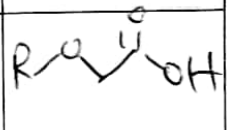
Model Answer

6	The reagent which gives the following reaction is ……. 	Tollen's Reagent $Ag(NH_3)OH$
7	The chemical name of the following compound is …… 	1,2,4-tribromo benzene
8	The following compound is ……. 	Stearic acid
9	The chemical unit of PVC polymer is ……. 	poly vinyl Chloride
10	The following is ……  amino acid	Serine

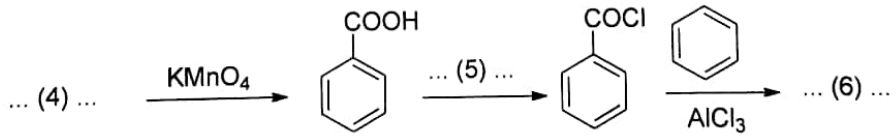
V) Draw or write the missing parts to complete the following transformations: (5 marks)

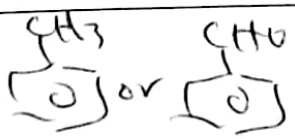
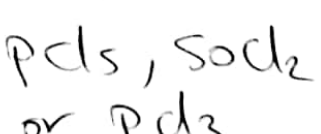
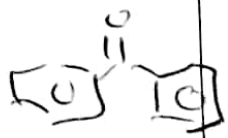
1)



	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