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Faculty of Sciences and Technology
Department of Process Engineering

2nd Year Engineer
Speciality: Process Engineering

Final Exam: Industrial Organic Chemistry

Duration: 1h30

Exercise 1: (7.5 pts)

1- Write the semi-developed formulas of the following compounds:

a) 2-methylbutan-1-ol ; **b)** 2-ethyl-3-methylbutanal ;

c) 2,3-dimethylpentan-3-one ; **d)** 3- methylbutanoic acid.

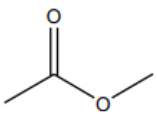
2- Draw in zig-zag topological formula the structures corresponding to the following names:

a) 6-hydroxy-5-methyloctane-2,4,7-tricarbaldehyde

b) 6-chloro-3-ethyl-N,N-dimethylheptan-3-amine

c) 1-bromo-4- methoxybenzene

3- Reproduce and name the following molecules:



(a)

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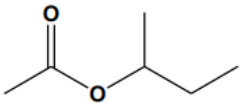

(b)

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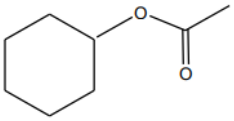

(c)

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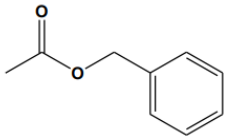
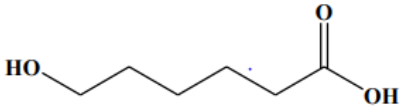


(d)



(e)

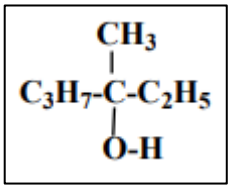
Exercise 2: (8 pts)

1- A nucleophilic substitution reaction makes it possible to prepare 2-ethyl-2-methyl pentanetrile from 3-chloro-3-methyl hexane.

a)- Write the balance equation of this reaction SN.

b)- Explain the mechanism by specifying which SN reaction is involved.

2- **A** is subjected to dehydration:



A

- Two compounds B and C are formed, Write the mechanism of the reaction taking the place and name all the products formed specifying which type of reaction is involved.

Exercise 3: (4.5 pts)

- Choose the correct answer:

1. What is the primary role of the surfactants in soaps and detergents?

A. To reduce water hardness
B. To reduce the surface tension of water
C. To neutralize impurities
D. To eliminate bacteria

2. Why do soaps not lather well in hard water?

A. They react with chlorine to form precipitates.
B. They form insoluble salts with calcium and magnesium ions.
C. They dissolve completely without forming lather.
D. They decompose in an alkaline medium.

3. What is the main difference between soaps and detergents?

A. Soaps are biodegradable, while detergents are not.
B. Soaps are made from synthetic products, while detergents are natural.
C. Soaps are effective in soft water, while detergents are effective in hard water.
D. Soaps produce more lather than detergents.

4. What is the main characteristic of continuous soap manufacturing?

A. Production in successive steps with pauses between cycles.
B. Uninterrupted production with a constant flow.
C. Suitable only for small quantities.
D. Requires minimal automation.

5. Batch manufacturing is particularly suitable for:

A. Large-scale production of standardized soaps.
B. Custom formulations or small-scale production.
C. Reducing unit costs at large scale.
D. Fast and continuous production.

6. What is the major disadvantage of continuous manufacturing?

A. Longer production time.
B. High initial investment.
C. Inability to produce standard soaps.
D. Limited quality control.

7. Which manufacturing method offers greater flexibility in formulations?

A. Continuous manufacturing
B. Batch manufacturing
C. Both
D. Neither

8. What is the common characteristic of the both methods?

A. The ability to produce continuously.
B. The use of similar surfactants and oils.
C. Full automation of the process.
D. Complete standardization of products.

9. What is the main advantage of batch manufacturing for small producers?

A. Faster production.
B. Low initial investment.
C. Better product standardization.
D. Ability to produce continuously.

Good luck