Entrance exam in chemistry (LS)
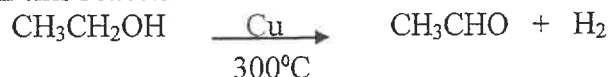
Check the right answer(s) in the table at the last page as per the following model:

I'm doing an exam:
a) In chemistry
b) In physics
c) In biology
d) At the faculty of agricultural sciences and veterinary medicine.

a	b	c	d
X			X

1– In this reaction :

$$CH_3CH_2OH \xrightarrow[300°C]{Cu} CH_3CHO + H_2$$

a) Catalyst increases the rate of reaction.
b) Catalysis by Cu is a heterogeneous catalysis
c) Catalysis by Cu is a homogeneous catalysis
d) Catalysis by Cu is a selective catalysis

2- In a autocatalysis reaction
a) One of the reagents acts as a catalyst.
b) One of the products acts as a catalyst.
c) We add an acid catalyst.
d) We add a metallic catalyst.

3- In the Brönsted theory, an acid can :
a) accept a proton.
b) accept an electron.
c) give an electron.
d) give a proton.

4- In the following acid/base couples, which are written correctly?
a) H_2O/H_3O^+
b) H_2O/OH^-
c) H_3O^+/H_2O
d) H_3O^+/OH^-

5- We add 100 mL of a solution of Na_2CO_3 0.1 mol/L to 100 mL of a solution of NaCl 0.2 mol/L, the concentration of Na^+ ions in the final solution is equal to:

a) 0.2 mol.L^{-1} b) 0.1 mol.L^{-1} c) 0.15 mol.L^{-1} d) 0.25 mol.L^{-1}

6- 400 mL of aqueous solution contains 2.12 g of Na_2CO_3 (106 g/mole). The molar concentration of Na^+ in this solution is :

a) 0.2 mol.L^{-1} b) 0.05 mol.L^{-1} c) 0.1 mol.L^{-1} d) 2 mol.L^{-1}

7- 10 mL of a hydrochloric acid HCl (solution S) are titrated with sodium hydroxide NaOH of concentration $C = 10^{-1}$ mol.L^{-1}. An equivalent volume of NaOH equal to 10 mL is found.

I- During the titration :

a) The pH of the solution increases
b) The pH of the solution decreases
c) The titration curve has 2 points of inflection
d) The titration curve has a buffer zone

II- The concentration of the solution S is :

a) 10^{-2} mol.L^{-1} b) 10^{-1} mol.L^{-1} c) 1 mol.L^{-1} d) 10^{-4} mol.L^{-1}

III- pH of the solution S before titration is :

a) 4 b) 2 c) 1 d) 7

IV- At the end of titration, the pH of the solution is :

a) 7 b) 13 c) 11 d) 1

8- Which volume of water we need add to 500 mL of HCl solution 0.15 mol.L^{-1} for obtained solution 0.1 mol.L^{-1}

a) 750 mL b) 500mL c) 250 mL d) 200 mL

9- **I- We mix 10 mL of NaOH 0.1 mol.L^{-1} and 90 mL of distilled water : (solution A), pH of solution A is :**

a) 13 b) 12 c) 11 d) 10

II- We add to solution A 10 mL of HCl 0.01 mol.L^{-1}. Calculate pH of the obtained solution.

a) 12.91 b) 12 c) 11 d) 11.91

10 -The intermolecular dehydration of an alcohol product:

a) an alkene   b) an aldehyde   c) an ester   d) an ether

11- Butan-1-ol is :

a) A functional isomer of butan-2-ol
b) A positional isomer of butan-2-ol
c) More soluble than butan-2-ol
d) More volatile butan-2-ol.

12-The oxidation reaction of molecule in organic chemistry can be :

a) An addition of a hydrogen atom
b) An addition of a oxygen atom
c) An elimination of a water molecule
d) An addition of a water molecule

**13-   What is the correct name of the following compound?**

$(CH_3)_2CH —CH\ OH— CH_2 —CH_3$

a) 1-ethyl-1-methylethanol
b) 2-hydroxy-2-methylbutan

c) 1,1-dimethylpropan-1-ol
d) 2-methylpentan-3-ol

14- Acetic acid can be obtained by:

a) Hydrogenation of ethylene
b) Oxidation of ethanol
c) Hydrolysis of dimethylether
d) Hydrogenation of ethanal

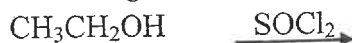**15- gas produced in the following reaction is :**

$CH_3CH_2OH\quad + Na \longrightarrow$
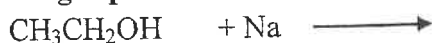
a) O_2 b) CH_4 c) CO   d) H_2

16 -How many isomers there is for C_3H_8O :

a) Two isomers
b) Four isomers

c) Three isomers
d) Five isomers

17 -the following reaction is a :

$CH_3CH_2OH \xrightarrow{SOCl_2}$

a) substitution reaction   b) addition reaction   c)oxidation reaction
d)hydrolyzes reaction

18 - gas produced in the following reaction is   :

$CH_3CH_2OH \xrightarrow{SOCl_2}$

a)O_2 b) H_2 c) CO   d) SO_2

Answer table : put X to the right answer in the table below :

Number	a	b	c	d
1				
2				
3				
4				
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5				
6				
7-I				
7-II				
7-III				
7-IV				
8				
9-I				
9-II				
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10				
11				
12				
13				
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15				
16				
17				
18				