

**Entrance exam in chemistry (GS)**

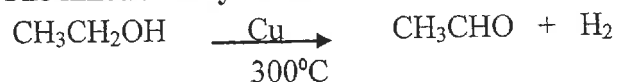
Check the right answer(s) in the table at the last page as per the following model :

**I'm doing an exam :**

- a) In chemistry
- b) In physics
- c) In biology
- d) At the faculty of agricultural sciences and veterinary medicine.

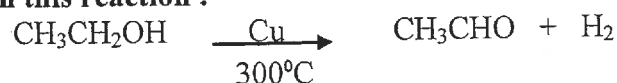
a	b	c	d
X			X

**1- The kinetic study of this reaction shows that :**



- a) the concentration of  $\text{CH}_3\text{CH}_2\text{OH}$  increases with time.
- b) the concentration of  $\text{H}_2$  decreases with time.
- c) The rate of disappearance of  $\text{CH}_3\text{CH}_2\text{OH}$  is equal to the rate of formation of  $\text{CH}_3\text{CHO}$
- d) The rate of formation of  $\text{CH}_3\text{CHO}$  is higher than the rate of formation of  $\text{H}_2$

**2-- In this reaction :**



- 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

**3- 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.

4- In the Brönsted theory, an acid can :

- a) accept a proton.
- b) accept an electron.
- c) give an electron.
- d) give a proton.

5- In the following acid/base couples, which are written correctly?

- a)  $\text{H}_2\text{O}/\text{H}_3\text{O}^+$
- b)  $\text{H}_2\text{O}/\text{OH}^-$
- c)  $\text{H}_3\text{O}^+/\text{H}_2\text{O}$
- d)  $\text{H}_3\text{O}^+/\text{OH}^-$

6- Two litres of  $\text{Na}_2\text{CO}_3$  (106 g/mole) contain 10.6 g of this salt, the concentration of this solution is :

- a) 0.025 mol.L<sup>-1</sup>
- b) 0.05 mol.L<sup>-1</sup>
- c) 0.035 mol.L<sup>-1</sup>
- d) 0.1 mol.L<sup>-1</sup>

7- We add 100 mL of a solution of  $\text{Na}_2\text{CO}_3$  0.1 mol/L to 100 mL of a solution of  $\text{NaCl}$  0.2 mol/L, the concentration of  $\text{Na}^+$  ions in the final solution is equal to:

- a) 0.2 mol.L<sup>-1</sup>
- b) 0.1 mol.L<sup>-1</sup>
- c) 0.15 mol.L<sup>-1</sup>
- d) 0.25 mol.L<sup>-1</sup>

8- 400 mL of aqueous solution contains 2,12 g of  $\text{Na}_2\text{CO}_3$  (106 g/mole). The molar concentration of  $\text{Na}^+$  in this solution is :

- a) 0.2 mol.L<sup>-1</sup>
- b) 0.05 mol.L<sup>-1</sup>
- c) 0.1 mol.L<sup>-1</sup>
- d) 2 mol.L<sup>-1</sup>

9- The pH of a solution is 3. The concentration of ions  $\text{H}_3\text{O}^+$  is equal to :

- a)  $10^{-2}$  mol.L<sup>-1</sup>
- b)  $10^{-4}$  mol.L<sup>-1</sup>
- c)  $10^{-3}$  mol.L<sup>-1</sup>
- d)  $10^{-1}$  mol.L<sup>-1</sup>

10- A solution has a pH = 2, its concentration in hydroxide ions  $\text{OH}^-$  is:

- a)  $10^{-3}$  mol.L<sup>-1</sup>
- b)  $10^{-11}$  mol.L<sup>-1</sup>
- c)  $10^{-7}$  mol.L<sup>-1</sup>
- d)  $10^{-12}$  mol.L<sup>-1</sup>

11- 10 mL of a hydrochloric acid  $\text{HCl}$  (solution S) are titrated with sodium hydroxide  $\text{NaOH}$  of concentration  $C = 10^{-1}$  mol.L<sup>-1</sup>. An equivalent volume of  $\text{NaOH}$  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<sup>-1</sup>
- b)  $10^{-1}$  mol.L<sup>-1</sup>
- c) 1 mol.L<sup>-1</sup>
- d)  $10^{-4}$  mol.L<sup>-1</sup>

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

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

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

13-I- We mix 10 mL of NaOH  $0.1 \text{ mol.L}^{-1}$  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  $0.01 \text{ mol.L}^{-1}$  calculate pH of the obtained solution.

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

14- We add  $V_1 = 100 \text{ mL}$  of  $\text{H}_2\text{SO}_4$  ( $C_1 = 5.10^{-2} \text{ mol.L}^{-1}$ ) at  $V_2 = 100 \text{ mL}$  of  $\text{HNO}_3$  ( $C_2 = 2.10^{-2} \text{ mol.L}^{-1}$ ).  $\text{H}_2\text{SO}_4$  and  $\text{HNO}_3$  are strong acids. The pH of the mixture is:

- a) 12.0                                      b) 1.22                                      c) 2.5                                      d) 3.9

15 -The intermolecular dehydration of an alcohol product:

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

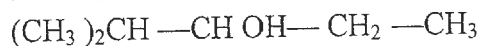
16 - Butan-1-ol is :

- 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.

17-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

18- What is the correct name of the following compound?

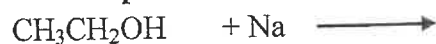


- a) 1-ethyl-1-methylethanol  
b) 2-hydroxy-2-methylbutan  
c) 1,1-dimethylpropan-1-ol  
d) 2-methylpentan-3-ol

19- Acetic acid can be obtained by:

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

20- Gas produced in the following reaction is :

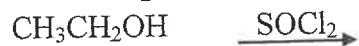


- a)  $\text{O}_2$       b)  $\text{CH}_4$       c)  $\text{CO}$       d)  $\text{H}_2$

21 -How many isomers there is for  $\text{C}_3\text{H}_8\text{O}$  :

- a) Two isomers  
b) Four isomers  
c) Three isomers  
d) Five isomers

22- The following reaction is a :



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

23 - Gas produced in the following reaction is :



- a)  $\text{O}_2$       b)  $\text{H}_2$       c)  $\text{CO}$       d)  $\text{SO}_2$



