الجامعة اللبنانية

كلية الصحة العامة

مباراة الدخول 2022– 2021

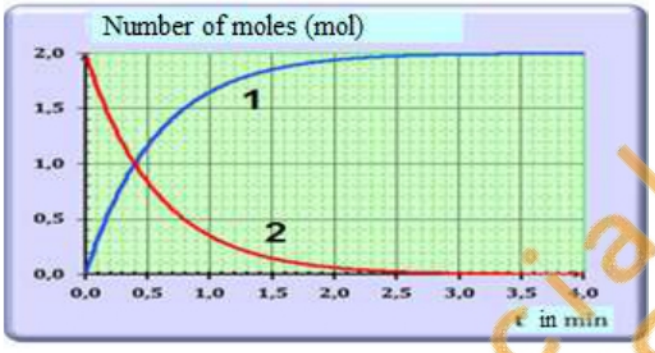
مسابقة في الكيمياء – Series B

المدة : ٤٥ دقيقة عدد الصفحات: ٣

For each of the following questions circle <u>the right answer</u>. (Only one answer is correct)

1. The graph below represents the evolution of the number of moles of CH_3Cl and CH_3OH as a function of time during the reaction of the equation: (1.5pt)

$$CH_3Cl_{(aq)} + HO^-_{(aq)} \rightarrow CH_3OH_{(aq)} + HCl_{(aq)}$$



a. Curve (2) is that of methanol CH_3OH (aq).
b. Curve (1) is that of HO^- (aq).
c. The initial number of moles of HO^- (aq) is equal to 2.0 mol.
d. The number of moles of HCl obtained at the end of the reaction is greater than 2.0 mol.

2. Consider the following chemical equilibrium: (1.5pt)

$$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)} \quad K_c = 50$$

The value of the constant K_c of the following equilibrium:

$$2HI_{(g)} \rightleftharpoons H_{2(g)} + I_{2(g)}$$ is :

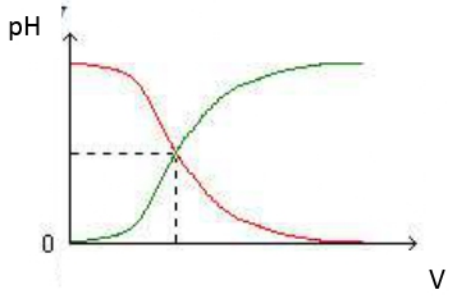
a. - 50
b. 0,02
c. 25
d. 50

3. During the titration of a strong acid (beaker) with a strong base (burette). (1pt)

a. The initial number of moles introduced in the beaker and the number of moles added from the graduated burette are in stoichiometric ratio only at equivalence.
b. n (H_3O^+) < n (HO^-) before the equivalence.
c. n (H_3O^+) > n (HO^-) before the equivalence.
d. The ions H_3O^+ and HO^- are present in the beaker before and at equivalence.

Social UL FSP2 Club

4. The graph below, represents the titration of a strong acid and a strong base, the point of intersection of the curves has a pH (1pt)



a. = 7
b. < 7
c. > 7
d. Can't be determined

5. To perform the set-up of a pH-metric titration of 8.5mL of acidic solution, the glassware used are: (1pt)

a. Beaker and graduated burette.
b. Beaker, graduated burette and 10mL volumetric pipet.
c. Beaker, graduated burette and 10mL graduated pipet
d. Beaker, graduated burette and 10mL volumetric flask.

6. A basic solution of initial concentration C_b is considered strong if : (1.5pt)

a. The concentration of HO^- ions coming from this solution is greater than its initial concentration.
b. Its pH = 14 + log$[H_3O^+]$
c. The dissociation reaction of this solution in water is partial.
d. $[HO^-] = C_b$.

7. A monosaturated non-cyclic carboxylic acid (A) contains 53.3% of oxygen by mass. (1.5pt)
C = 12; O = 16 and H =1

a. The molecular formula of (A) is $C_3H_6O_2$.
b. (A) has 3 isomers.
c. Methyl methanoate is an isomer of (A).
d. Methyl ethanoate is an isomer of (A).

8. To increase the % yield of esterification starting from an equimolar mixture of a carboxylic acid and alcohol one can proceed as follow: (1pt)

a. Increase the temperature.
b. Extend the time of heating.
c. Replace the carboxylic acid by an acid anhydride.
d. When the equilibrium is established remove the acid or the alcohol.

Good Luck

Social ULFSP2 Club

9. The following carbohydrates are classified as follow: (1.5pt)

a. Glucose is a monosaccharide, sucrose is a disaccharide and glycogen is a polysaccharide.
b. Lactose is a monosaccharide, galagtose is a disaccharide and fructose is a polysaccharide.
c. Maltose is a monosaccharide, glycogen is a disaccharide and glucose is a polysaccharide.
d. Starch is a monosaccharide, glucose is a disaccharide and maltose is a polysaccharide.

10. Lipids have many roles and many structures in the human body. (1.5pt)

a. Triglycerides are complex lipids.
b. Cholesterol is a non-steroid nucleus.
c. Oils are solids at ambient temperature while fats are liquids.
d. Fats and oils are the principal form of energy storage.

11. Among the role of proteins in the human body, we mention: (1.5pt)

a. Fortify bones and teeth.
b. Enzymatic, transportation and defense.
c. Energetic reserve.
d. They constitute the main components of the cell membranes.

12. About minerals and vitamins. (1.5pt)

a. Minerals are organic substances while vitamins are inorganic substances.
b. Minerals and vitamins can be synthesized by the human body.
c. Minerals are classified into macro and trace minerals, while vitamins are classified into hydrosoluble and liposoluble.
d. Minerals contain only C, H and O, while vitamins do not.

13. 100 g of milk contains: 4.7 g carbohydrates, 3.8 g lipids and 3.3 g proteins. Knowing that 1 g of carbohydrates provides 4Kcal, 1 g of lipids 9Kcal and 1 g of proteins 4Kcal, the energy value of 100 g of milk is: (1.5pt)

a. 6.62Kcal.
b. 66200 cal.
c. 662Kcal.
d. 6620 cal.

14. Broad-spectrum antibiotics are: (1.5pt)

a. Effective against a wide variety of microorganisms.
b. Effective against specific microorganisms.
c. Effective against virus.
d. None of the above.

15. The bacteria that can no longer be killed by an antibiotic are called: (1pt)

a. Strong.
b. Weak.
c. Resistant.
d. Fungicidal.

Good Luck

Social Club ULFSP2