CHEMISTRY AND INTRODUCTION TO BIOCHEMISTRY
ACADEMIC YEAR 2019-2020 (21 Feb. 2020)

Surname and Name ………..

Matr. Number …........................ year...........
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For every quiz there is only one correct answer. For stoichiometry exercises, write the calculus steps and the result.

1) Sodium belongs to the first group and to the second period of the periodic table and therefore:

it has 3 electrons	[ ]
it has 4 electron levels	[ ]
it has 1 electron in it external shell	[ ]
it has 2 electrons in it external shell	[ ]

2) The formula of calcium phosphate is:

Ca_3PO_4	[ ]
$Ca_3(PO_4)_2$	[ ]
$Ca_2(PO_4)_3$	[ ]
Ca_2PO_4	[ ]

3) By oxidation of propanal one obtains

a sugar	[ ]
a chiral compound	[ ]
a carboxylic acid	[ ]
an hemiacetal	[ ]

2) Maleic acid and fumaric acid are:

optical isomers	[ ]
geometric isomers	[ ]
conformational isomers	[ ]
functional isomers	[ ]

5) the hydroxyl groups of glycerol are:

all primary	[ ]
all secondary	[ ]
two primary and one secondary	[ ]
one primary and two secondary	[ ]

6) The standard redox potential of nickel (Ni^{2+}/Ni) is -0.25 V, the standard redox potenial of zinc (Cu^{2+}/Cu) is +0,34 V, therefore at stanrd conditions:

metallic nickel oxidizes the copper II ion	[ ]
metallic nickel reduces the copper II ion	[ ]
the nickel II ion reduces metallic copper	[ ]
the nickel II ion oxidizes metallic copper	[ ]

7) Draw the chemical formula of each compound indicating all the atoms, bonds and charges (when applicable): benzoic acid, ethyne, D-glyceraldehyde, urea.

8) Calculate the pH of a solution prepared by dissolving 10 g of acetic acid and 6 g of sodium acetate in water in a final volume of 500 mL (K_A= 1.8·10^{-5} M).

10) 36 L of molecular oxygen at 1.2 atm and 20 °C are cooled down to 11 °C and brought to a pressure of di 650 mmHg. What is the final volume of the gas?

8) Calculate the osmotic pressure at 27 °C of an 0.8 m (molal) solution of aluminium phosphate with density=1.066 g/mL.

11) 1 mole of SO_3 is introduced into a 10 L container at 10 °C. The following homogeneous equilibrium is achieved in the gaseous phase: $2\ SO_3 \rightleftharpoons 2\ SO_2 + O_2$ with a concentration of O_2 equal to 0.025 M. Calculate K_C e K_P, indicating their dimensions.