Philadelphia University
Faculty of Science
Basic Sciences Department

General Chemistry for Health Science - 0216145

Date: 25 / 6 /2023 **Final Exam (1)** **Second Semester 2022-2023**
Name: ……
Student No.: ……
Section (الشعبة) :……
Exam time: 120 min
Instructor name:

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13					**28**				
14					**29**				
15					**30**				

1 H Hydrogen 1.01																	2 He Helium 4.00
3 Li Lithium 6.94	4 Be Beryllium 9.01											5 B Boron 10.81	6 C Carbon 12.01	7 N Nitrogen 14.01	8 O Oxygen 16.00	9 F Fluorine 19.00	10 Ne Neon 20.18
11 Na Sodium 22.99	12 Mg Magnesium 24.31											13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P Phosphorus 30.97	16 S Sulfur 32.07	17 Cl Chlorine 35.45	18 Ar Argon 39.95
19 K Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 Ti Titanium 47.87	23 V Vanadium 50.94	24 Cr Chromium 52.00	25 Mn Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.69	29 Cu Copper 63.55	30 Zn Zinc 65.39	31 Ga Gallium 69.72	32 Ge Germanium 72.61	33 As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.80
37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 Ag Silver 107.87	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	52 Te Tellurium 127.60	53 I Iodine 126.90	54 Xe Xenon 131.29
55 Cs Cesium 132.91	56 Ba Barium 137.33	57 La Lanthanum 138.91	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)
87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (266)	107 Bh Bohrium (264)	108 Hs Hassium (269)	109 Mt Meitnerium (268)									

QUESTION ONE (30 POINTS) **الرجاء نقل رمز الإجابة الصحيحة على الجدول في الصفحة الأولى**

1- The number of significant figures in 0.020415 is:

a- 2 b- 4 c- 5 d- 3

2- What is the oxidation number of manganese Mn in $KMnO_4$

a- +2 b- -2 c- -7 d- +7

3- For the following reaction Identify the conjugate acid/base pair

$$CH_3COOH + H_2O \leftrightarrows CH_3COO^- + H_3O^+$$

a - CH_3COOH / H_2O c- H_2O / H_3O^+

b- CH_3COOH/ CH_3COO^- d- CH_3COO^- / H_3O^+

4- In the dilution process. How many millimeters of 5.6 M HCl solutions are needed to prepare 490.0 ml of 3.8 M HCl solution?

a- 233.5 ml b- 299.4 ml c- 332.5 ml d- 177.0 ml

5- The instrument used to measure the atmospheric pressure is called

a- Seismometer b- Hydrometer c- PH meter d- Barometer

6- Which of the following gases would have the lowest average molecular speed?

a- N_2 b- CO_2 c- Ar d- H_2

7- Solutions of K_2SO_4(aq), $Pb(NO_3)_2$(aq) are mixed together. What is the likely precipitate?

a- K_2SO_4 b- $Pb(NO_3)_2$ c- $PbSO_4$ d- KNO_3

8- What is the density of Xe gas at a pressure of 2.40 atm and a temperature of 10°C?

a- 82.3g/L b- 8.65 g/L c- 13.6 g/L d- 0.64 g/L

9- The electron configuration of Magnesium (Mg) has ……unpaired electrons and its

a - 1, paramagnetic c- 2, Diamagnetic

b- 0, Diamagnetic d- 2, paramagnetic

10- The electron configuration of Copper Cu is

a- $[Ar]4s^1 3d^5$

b- $[Ar]4s^2 3d^9$

c- $[Ar]4s^1 3d^{10}$

d- $[Ar]4s^2 3d^4$

11- What is the concentration of Na^+ in 0.65 M of Na_2SO_4?

a- 1.3 M b- 1.95 M c- 0.65 M d- 0.325 M

12- A mixture of gases contains 8.24 mole of CH_4, 0.421 mole of C_2H_2, and 0.116 mole of C_3H_6 if the total pressure is 1.37 atm, calculate the partial pressure of CH_4 gas.

a- 1.92 atm b- 0.0181 atm c- 0.0657 atm d- 1.29 atm

13- Which one of the following sets of quantum numbers is not correct?

a- n=4 , l=3 , m_l= -3, m_s= +1/2

b- n =4, l=2, m_l= +2, m_s= - 1/2

c- n=4, l=4, m_l= +2, m_s= +1/2

d- n=4, l=1, m_l=0 , m_s = +1/2

14- Which of the following is the electron configuration of Na^+?

a- $1S^2 2S^2 2P^6$ b- $1S^2 2S^2 2P^6 3S^1$ c- $1S^2 2S^2 2P^4$ d- $1S^1$

15- Which of the following species has the highest number of unpaired electrons (single electrons)?

a- S^- b- S c- S^+ d- S^{-2}

16-What is the maximum number of electrons in the d-orbital?

a - 10 c- 6 b- 14 d- 2

17- Which of the following is not isoelectronic with a noble gas?

a- S^{2-} b- Ba^+ c- Al^{3+} d- Sb^{3-}

18- Describe the change in hybridization (if any) of the Al atom in this reaction:

$AlCl_3 + Cl^- \longrightarrow AlCl_4^-$

a- $p \rightarrow sp^2$ b- $sp \rightarrow sp^2$ c- $sp^2 \rightarrow sp^3$ d- $sp \rightarrow sp^3$

19- How many grams of KHP (molar mass 204.2 g/mol) are needed to neutralize 15.5 mL of a 0.12 M NaOH solution?

a- 1.86 b- 3.79 c- 0.55 d- 0.38

20- Calculate the pH for 0.09 M of KOH solution.

a- 13.78 b- 12.95 c- 5.22 d- 8.59

21- The element that has an outer electronic valence shell $4s^2\,4p^5$ is?

a-Br b-Na c-Ar d- K

22- If K_w is 1×10^{-14} at 25°C, what is the $[H^+]$ at 25°C, if the $[OH^-] = 2.3\times10^{-5}$ M?

a- 1.42×10^{-8} M b- 7×10^{-7} M c- 4.35×10^{-10} M d- 1×10^{-14} M

23- The geometry of H_2O is?

a-Linear b- Tetrahedral c- Bent d- Trigonal planar

24- Which one of the following does not obey the octet rule

a-PCl_3 b- CBr_4 c- BeH_2 d- OF_2

25- What is the number of nonbonding electrons (lone pair) in O_2?

a- 4 b- 2 c- 3 d- 0

26- What is the number of moles for 3.1 g sulfur S (32 g/mol)?

a- 0.96 B- 3.1 c- 0.097 d- 0.11

27- if the Ka of HCN = $6.2\text{x}10^{-10}$, what is the Kb of its conjugate base CN^-

a- $1.6\text{x}10^{-5}$ b-$6.2\text{x}10^{-10}$ c-$1\text{x}10^{-14}$ d-$6.2\text{x}10^{+4}$

28- Which acid is the strongest acid?

Ka of HCN = $6.2\text{x}10^{-10}$	Ka of $CH_3COOH = 1.8\text{ x}10^{-5}$
Ka of HF = $6.3\text{x}10^{-4}$	Ka of $HNO_2 = 4.0\text{ x}10^{-4}$

a – HCN b-HF c- HNO_2 d- CH_3COOH

29- What is the volume in L occupied by 5.58 g of NH_3 at STP?

a- 125 b- 22.4 c- 8.0 d-7.4

30- Which one of the following statements is correct?

a. The volume of a gas is inversely (عكسي)proportional to the number of moles of the gas present.

b. The pressure of a fixed amount of gas is directly proportional (طردي)to the moles of the gas.

c. The relationship between pressure (P) versus 1/volume (1/V) is directly proportional.

d. Both B and C.

QUESTION TWO (3 POINTS)

5.12 g of an ionic compound containing Iodide ion I^- dissolved in water and treated with $AgNO_3$ to form 6.37 g AgI precipitate, what is the percent by mass of I^- in the original sample? ((Molar Mass of I = 126.9 g/mol, Ag = 107.9 g/mol, N = 14 g/mol, O = 16 g/mol))

QUESTION THREE (2 POINTS)

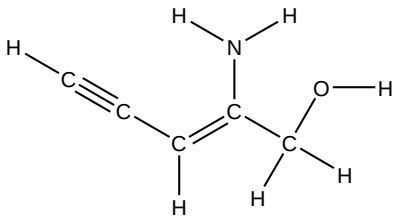
For the next structure answer the following

1-What is the number of σ bonds…….

2-What is the number of π bonds…….

3- The hybridization of the O atom is …….

4-number of nonbonding electrons (lone pair) is ……



QUESTION FOUR (3.5 POINTS)

suppose 65.38 g of Zn (Mwt.=32 g/mol) is added to an HCl solution and H_2 gas is liberated according to the following equation. How many liters of hydrogen gas would be generated, supposing that it was collected purely at 25° C and 544 mmHg pressure?

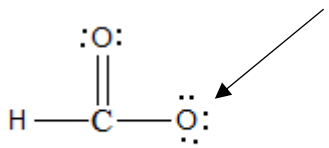
$Zn + HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$

QUESTION FIVE (2.5 POINTS)

a- **Draw the Lewis dot symbol for sulfur atom S**

b- **Draw Lewis structure for CO_2 (C is the central atom)**

c- **What is the formal charge of labeled oxygen in HCO_2^-?**



Good Luck