Philadelphia University
Faculty of Science
Basic Sciences Department
First Semester 2023-2024
Date: 30 / 1/2024

(Final Exam)

General Chemistry for Health Science - 0216145
Exam time: 120 min
Instructor name:

Name: .....**Student No.:** ..... **Section (الشعبة) :**.....

Question no.	A	B	C	D	Question no.	A	B	C	D
1					17				
2					18				
3					19				
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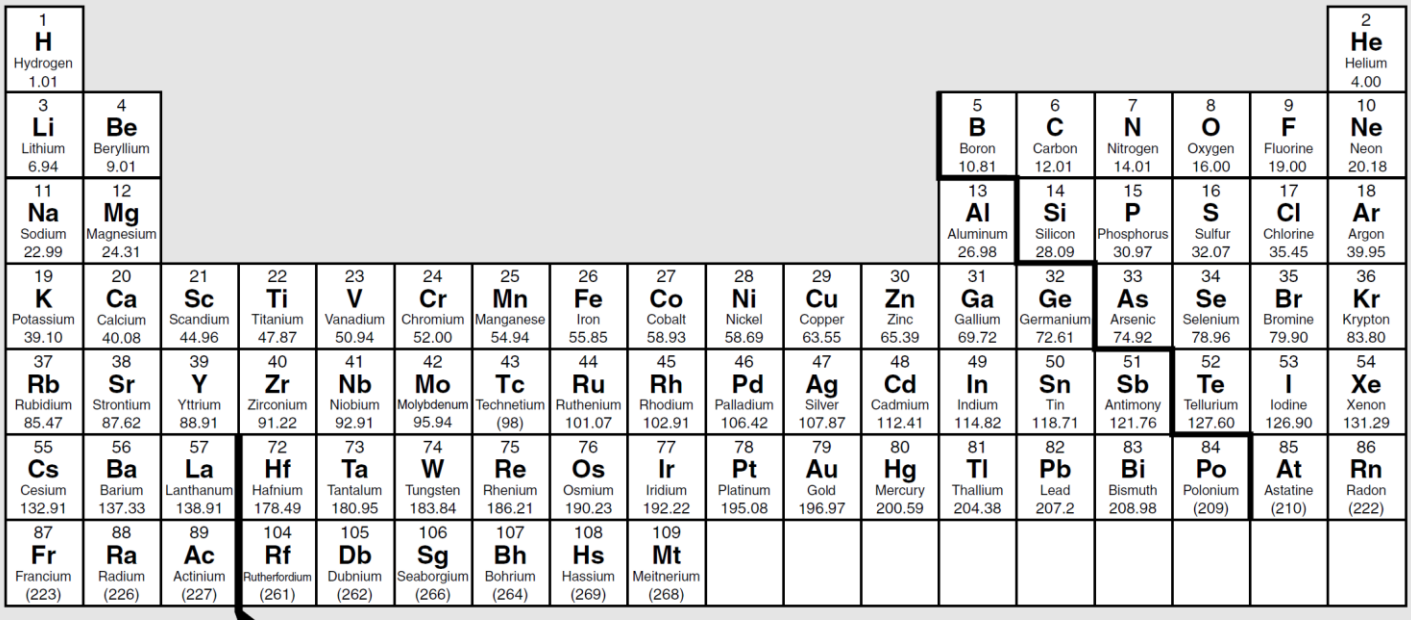


1 H Hydrogen 1.01																	2 He Helium 4.00
3 Li Lithium 6.94	4 Be Beryllium 9.01											5 B Boron 10.81	6 C Carbon 12.01	7 N Nitrogen 14.01	8 O Oxygen 16.00	9 F Fluorine 19.00	10 Ne Neon 20.18
11 Na Sodium 22.99	12 Mg Magnesium 24.31											13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P 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)									

Circle the Correct Answer (1.25 point each question)

الرجاء نقل رمز الإجابة الصحيحة على الجدول في الصفحة الأولى

(gas constant = 0.08216 atm.L /mol. K)

1- The number of significant figures in 0.0245 is:

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

2. PO_4^{-3} is:

a- polyatomic molecules b- ionic compound
c- polyatomic ions d- diatomic molecule

3- 27.22g of X (molar mass = 31 g/mol) react with 20 g of Y to form X_2Y compound. Calculate the molar mass of Y?

a- 30.65 b- 20.56 c- 45.56 d- 40.65

4- Which chemical substance is the oxidizing agent in this reaction?

$$2\ Sr + O_2 \longrightarrow 2\ SrO$$

a- Sr^{+2} b- O_2 c- Sr d- O^{-2}

5 - A 0.8431 g acid sample KHP ($KHC_8H_4O_4$) (Molecular weight of KHP = 204 g/mol).

Reacts with 41.75 mL of KOH solution for complete neutralization. What is the molarity of the KOH solution?

a- 0.158 M b- 0.099 M c- 0.139 M d- 0.079 M

6- What is the concentration of Na^+ in 0.325 M ,200mL of NaCl?

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

7- For the following reaction identify the conjugate acid/base pair

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

a - CH_3COOH / H_2O c- H_3O^+ / H_2O
b- CH_3COO^-/ CH_3COO^- d- CH_3COO^- / H_3O^+

8- 5.12 g of an ionic compound containing Iodide ion I^- dissolved in water and treated with $AgNO_3$ to form 7.23 g AgI precipitate, what is the percent by mass of I^- in the original sample?

a- 76.3% b- 37.9% c- 67.3% d- 73.8%

9- If K_w is 1×10^{-14} at 25°C, what is the $[H^+]$ at 25°C, if the $[OH^-] = 1.4\times10^{-6}$ M?

a- 1.42×10^{-8} M b- 7×10^{-9} M c- 4.35×10^{-10} M d- 1×10^{-14} M

10- Calculate the pH of a solution if it's $[OH^-] = 1.58\times10^{-13}$ M and indicate whether the solution is acidic, basic, or neutral.

a-3.15, acidic b- 1.2, acidic c- 10.8, basic d-11.8, basic

11- If K_a of HCN = $6.3x10^{-1}$, what is the K_b of its conjugate base CN^-?

a-$1.6x10^{-5}$ b-$6.2x10^{-10}$ c-$1.6x10^{-14}$ d-$6.2x10^{+4}$

12- Which acid is the strongest acid?

Ka of HCN = $6.2x10^{-10}$	**Ka of $CH_3COOH = 1.8 x10^{-5}$**
Ka of HF = $6.3x10^{-4}$	**Ka of $HNO_2 = 4.0 x10^{-4}$**

a -CH_3COOH b- HNO_2 c- HF d- HCN

13-What is the pH of a solution containing 0.00111 g of CH_3COOH (60 g/mol) in 1.00 L of solution, given that the Ka of CH_3COOH is 1.8×10^{-5}

$CH_3COOH \rightleftharpoons H^+ + CH_3COO^-$

a-5.74 b- 4.74 c- 1.87 d- 2.87

14- A solution which is formed by combining 300 mL of 0.020 molar NaOH with 610 mL of 0.010 molar HCl has a pH of:

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

15- A 0.010 M solution of weak monoprotic acid is 2.2% dissociated. What is the equilibrium constant Ka, for this acid?

a- 5.0×10^{-2} b- 4.8×10^{-6} c- 2.5×10^{-4} d- 2.5×10^{-5}

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

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

17- 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- 4.13 g/L

18- What is the volume in L occupied by 17.0 g of NH_3 at STP?

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

19- A mixture consisting of 0.140 mol N_2, 0.037 mol O_2, 0.104 mol CH_4, and an unknown amount of CO_2 occupies a volume of 8.48 L at 27°C and 1.06 atm pressure. How many moles of CO_2 are there in this sample?

a- 0.719 mol
b- 2.45 mol
c- 0.0839 mol
d- 3.77 mol

20- An unknown gaseous hydrocarbon consists of 85.63% carbon by mass. A 0.959-g sample of the gas occupies a volume of 0.51 L at STP. What is the identity of the gas?

a- C_4H_8

b- C_3H_6

c- CH_2

d- C_2H_4

21- What is the electron configuration of Mg in $MgCl_2$compound?

a-$1S^22S^22P^6$ c- $1S^22S^22P^5$

b-$1S^22S^22P^63S^2$ d- $1S^22S^22P^63S^23P^2$

22- The electron configuration of Sulfur (S) has ……unpaired electrons and its

a - 1, paramagnetic c- 2, Diamagnetic

b- 0, Diamagnetic d- 2, paramagnetic

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

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

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

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

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

24-What is the maximum number of electrons in the f-orbital?

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

25. Which of the following is isoelectronic with Mg^{+2}?

a- S^{2-} b- Ca c-Al^{3+} d- K

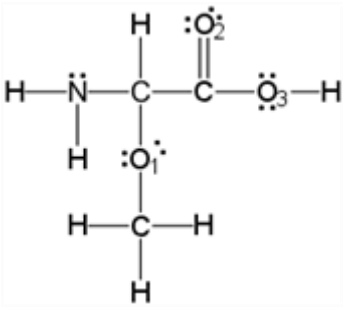
26- What is the molecular geometry and hybridization on nitrogen atom ?

a- Bent, sp^3

b- Trigonal planner, sp^3

c- Trigonal pyramidal, sp^3

d- Linear, sp



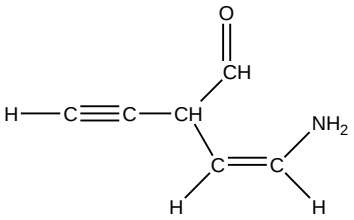
27. Which one of the following orbitals is <u>incorrect</u>?

a-1S b- 2P c-4F d- 2d

28- What is the <u>number of π bond, and lone pair</u> (nonbonding) in this structure?

a- 4 π, 3 pair b- 2 π, 3 pair

c- 3 π, 3 pair d- 5 π, 3 pair



29- Which of the following characteristics does <u>not</u> apply to PF_3?

a- two lone pair of electrons on phosphorus

b- contains polar bonds

c- trigonal pyramidal

d- has three σ bonds

30. The <u>electronic configuration</u> of Iron is:

a- $[Ne]4s^2$ b- $[Ar]4s^2$ c-$[Ar]4s^23d^6$ d- $[Ar]4s^23d^3$

31- Describe the <u>change in hybridization</u> (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- $sp \rightarrow sp^3$ d- $sp^2 \rightarrow sp^3$

32- Which one of the following molecules should be <u>bent</u>?

a- CCl_4 b- H_2O c- NH_3 d- $BeCl_2$

Good Luck