

Taibah University Deanery of Academic Services Unified Scientific Track



**Mock Test For** 

Quiz No. 2

## **Introduction to Chemistry (CHEM 101)**

(Chapters: 2 (Topic 07 only), 3 & 4)

<mark>Topics 07 – 15</mark>

For

## **Unified Scientific Track Students**

(All Campuses)

## 2<sup>nd</sup> Semester

1441 | 2019 - 2020

	ſ	Main	group	1		Perio	dic T	able o	of the	Elem	ents					Main	group			T
Perinun	od		Group number								_								8A	
	1	1 H Hydrogen 1.008	2A 2			1	Atomic num	iber -	čey C ← S	ymbol				3A 13	4A 14	5A 15	6A 16	7A 17	Helium 4.003	1
	2	Lithium 6.941	Beryllium 9.012				N	ame 1 An e	2.01 a	tomic mass				5 B Boron 10.81	Carbon 12.01	7 N Nitrogen 14.01	8 O Oxygen 16.00	9 F Fluorine 19.00	Neon 20.18	2
		Na	Mg					Transitio	on metals					A1	Si	15 P	16 S	C17	Ar	
	3	Sodium 22.99	Magnesium 24.31	3B 3	4B 4	5B 5	6B 6	7B 7	8	— 8B — 9	10	1B 11	2B 12	Aluminum 26.98	Silicon 28.09	Phosphorus 30.97	Sulfur 32.07	Chlorine 35.45	Argon 39.95	3
	4	19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	Vanadium	Cr Chromium	Manganese	Fe Iron	Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	Gallium	Germanium	33 As Arsenic	34 Se Selenium	Bromine	36 Kr Krypton	4
		37 37	38	39	40	41 1	42	43	44	45	46	47	48	49	50	51	52	53 53	54 V	Η
	5	Rubidium 85.47	Sr Strontium 87.62	Y Yttrium 88.91	Zr Zirconium 91.22	Nb Niobium 92.91	Molybdenum 95.94	Technetium (98)	Ruthenium 101.1	Rhodium 102.9	Pd Palladium 106.4	Ag Silver 107.9	Cd Cadmium 112.4	In Indium 114.8	Sn Tin 118.7	Sb Antimony 121.8	Tellurium 127.6	I Iodine 126.9	Xe Xenon 131.3	5
		55 Cs	56 Ba	57 L a	$\frac{72}{Hf}$	73 <b>T</b> a	74 W	75 Re	76 Os	77 Ir	78 Pt	79 <b>Δ</b> 11	<sup>80</sup> Ησ	81 T1	<sup>82</sup> Ph	83 Bi	84 Po	85 Δt	<sup>86</sup> Rn	Π
	6	Cesium 132.9	Barium 137.3	Lanthanum 138.9	Hafnium 178.5	Tantalum 180.9	Tungsten 183.8	Rhenium 186.2	Osmium 190,2	Iridium 192.2	Platinum 195.1	Gold 197.0	Mercury 200.6	Thallium 204.4	Lead	Bismuth 209.0	Polonium (209)	Astatine (210)	Radon (222)	6
		87 Fr	88 R a	89 A.C	104 Rf	105 Db	106 \$σ	107 Bh	108 Hs	109 Mt	110 Ds	111 <b>R</b> σ	112 Cn	113 Nh	114 Fl	115 Mc	116 L V	117 Ts	118 Og	Π
	7	Francium (223)	Radium (226)	Actinium (227)	Rutherfordium (267)	Dubnium (268)	Seaborgium (271)	Bohrium (272)	Hassium (270)	Meitnerium (276)	Darmstadtium (281)	Roentgenium (280)	Copernicium (285)	Nihonium (284)	Flerovium (289)	Moscovium (288)	Livermorium (293)	Tennessine (293)	Oganesson (294)	7
																	(/			

Lanthanides 6	Cerium 140.1	59 Pr Prase odymium 140.9	Neodymium 144.2	Promethium (145)	Samarium 150.4	Europium 152.0	Gadolinium 157.3	Tb Terbium 158.9	Dysprosium 162.5	Holmium 164.9	Erbium 167.3	69 Tm Thulium 168.9	Ytterbium 173.0	Lutetium 175.0	6
Actinides 7	90 Th Thorium 232.0	91 Pa Protactinium 231.0	92 U Uranium 238.0	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)	7

## **CHEM 101 SUPPLEMENTAL INFO.**

$d = \frac{\mathrm{m}}{\mathrm{V}}$	$d = \frac{\mathrm{m}}{\mathrm{v}} \qquad ^{\circ}\mathrm{C} = \frac{(^{\circ}\mathrm{F} - 32)}{1.8}$		× (°C)] + 32	K = °C + 273.15		
$M = \frac{n}{V}$	$\mathbf{M}_1  \mathbf{V}_1 = \mathbf{M}_2  \mathbf{V}_2$		$\mathbf{K}_{\mathbf{W}} = [\mathbf{H}_{3}\mathbf{O}^{+}]$	$\mathbf{pH} = -\log \left[\mathbf{H}_{3}\mathbf{O}^{+}\right]$		
Molecular formula $n = \frac{\text{molar mass}}{\text{molar mass}}$	$= \text{empirical formula} \times n$ of molecular formula of empirical formula	% mass of ele	ement $X = \frac{\text{mass of}}{\text{mass}}$	$\%$ yield = $\frac{\text{actual yield}}{\text{theoretical yield}} X 100$		
$\mathbf{q} = \mathbf{C} \times \Delta \mathbf{T}$	$\mathbf{w} = -\mathbf{P} \Delta \mathbf{V}$	q = m	$\times C_s \times \Delta T$	1 L.atm = 101.3 J	Avogadro's No. = 6.022 × 10 <sup>23</sup>	
Atomic mass = $\sum_{n} (fraction fraction fractio$	raction of isotope $n$ ) × (mass tion of isotope 1 × mass of is tion of isotope 2 × mass of is	sotope 1) sotope 2) + $\cdots$	Mole Conversion	s: Grams of Substance Address Molar Mass Moles of Substance	× Avo. Number Avo. Number of Atoms or Molecules	

Answer the following questions:									
1. Which of these of	elements has the sma	llest atomic radius?							
⊠ a. Ne	□ b. 0	🗖 c. Be	□ d. B						
2. Amongst the following elements; is the most metallic one.									
🗖 a. Ca	🗖 b. Sr	🗖 c. Be	☑ d. Ba						
3. The ionization e	3. The ionization energy of "Ca" is lower than the ionization energy of								
🗖 a. K	🖵 b. Ba	☑ c. Be	🗖 d. Ra						
4. The elements w	ith the lowest electro	n affinity are the							
🗖 a. alkaline earth i	metals.	☑ b. alkali metals.							
🗖 c. halogens		🗖 d. nonmetals							
5. As we move from	n bottom to top, and	from left to right on the <b>j</b>	periodic table;						
🗖 a. atomic radius i	increases & ionization e	energy increases.							
☑ b. atomic radius	decreases & ionization	energy increases.							
🗅 c. atomic radius i	ncreases & ionization e	energy decreases.							
d. atomic radius	decreases & ionization	energy decreases.							
6. Which of the fol	lowing elements has	the largest atomic radius	s?						
☑ a. Ra	🗖 b. Ca	🗖 c. Be	🗖 d. Ba						
7. Among the follo	wing elements; the m	ost electronegative one	is						
🗖 a. Si	🖵 b. Al	🖵 c. Mg	☑ d. S						
8. What is the emp	oirical formula of the	compound C <sub>2</sub> H <sub>4</sub> O <sub>2</sub> ?							
🗖 a. CHO	☑ b. CH <sub>2</sub> O	$\Box$ c. C <sub>2</sub> H <sub>2</sub> O <sub>2</sub>	$\Box d. C_2 H_4 O_2$						
9. Identify the type	e of the substance CO.								
🗖 a. atomic elemen	t	🗖 b. ionic compou	b. ionic compound						
🗹 c. molecular com	pound	🖵 d. molecular ele	🗖 d. molecular element						
10. What is system	natic name of Cu <sub>3</sub> (PO <sub>4</sub>	.)2?							
🗖 a. tricopper diph	osphate	☑ b. copper(II) ph	☑ b. copper(II) phosphate						
□ c. copper(I) phos	phorus oxide	d. copper(II) ph	d. copper(II) phosphide						

🗖 a. monocarbon tet	rachloride	☑ b. carbon tetrachloride						
C. tetrachloride mo	onocarbon	d. carbon trichloride						
12. Give the correct	t formula of ammonium	sulfate.						
□ a. SO4(NH4)2	☑ b. (NH4)2SO4	C. NH <sub>4</sub> SO <sub>4</sub>	□ d. (NH4)2SO3					
13. Indicate the for	mula of sulfite ion.							
□ a. S <sup>2-</sup>	□ b. SO4 <sup>2-</sup>	$\blacksquare$ c. SO <sub>3</sub> <sup>2-</sup>	$\Box$ d. SO <sub>3</sub> <sup>1-</sup>					
14. Name the comp	ound HBr <sub>(aq)</sub> .							
🗖 a. hydrogen mono	bromide	🗖 b. hydrobromide						
C. hydrogen mono	bromic acid	🗹 d. hydrobromic aci	d					
15. Calculate the m	olar mass of the compo	und (NH4)3PO4.						
🗹 a. 149.09 g/mol	🗖 b. 94.97 g/mol	🖵 c. 113.01 g/mol	🗖 d. 203.13 g/mol					
16. How many mole	es of $(NH_4)_2 S$ are there in	n 34.07 g of (NH <sub>4</sub> ) <sub>2</sub> S?						
🗖 a. 0.3 mol	☑ b. 0.5 mol	🖵 c. 1.2 mol	🗖 d. 2.3 mol					
17. How many mole	es and how many <u>atoms</u>	of Rb are there in a sam	ple weighing 30 g?					
<b>a</b> . 0.53 mol and 1.2	14×10 <sup>24</sup> atoms	□ b. 1.12 mol and 1.12×10 <sup>23</sup> atoms						
□ c. 3.51 mol and 3.2	20×10 <sup>23</sup> atoms	☑ d. 0.35 mol and 2.11×10 <sup>23</sup> atoms						
18. How many mole	ecules are there in 110 g	g of chlorine gas?						
□ a. 1.87 x 10 <sup>24</sup> mole	ecules	$\blacksquare$ b. 9.34×10 <sup>23</sup> molecules						
□ c. 7.12 x 10 <sup>23</sup> mole	ecules	$\Box$ d. 4.42×10 <sup>23</sup> molecules						
19. Calculate the ma	ass percent of oxygen in	the compound Fe(OH) <sub>3</sub>						
🗖 a. 76.66 %	⊠ b. 44.91 %	□ c. 52.26 %	🗖 d. 21.96 %					
20. Find the empiri	cal formula of a compou	and consisting of 21.96	% S and 78.04 % F.					
🗖 a. SF	□ b. SF <sub>2</sub>	<b>C</b> . SF <sub>4</sub>	$\mathbf{V}$ d. SF <sub>6</sub>					
21. What is the emp	pirical formula of a com	pound that contains 50.	05 % sulfur and 49.95 %					
oxygen (mass perce	ent)?							
□ a. SO <sub>3</sub>	$\blacksquare$ b. SO <sub>2</sub>	🖵 c. SO	$\Box$ d. S <sub>6</sub> O <sub>2</sub>					

22. A compound ha	s a molar mass of 515.4 pirical formula is CBr2?	6 g/mol. What is the m	olecular formula of this						
$\square$ a. CBr <sub>4</sub>	$\Box$ b. C <sub>4</sub> Br <sub>8</sub>	$\blacksquare$ c. C <sub>3</sub> Br <sub>6</sub>	$\Box$ d. C <sub>2</sub> Br <sub>4</sub>						
23. When the follow	ving equation is balance	d, the coefficient of H <sub>2</sub> O	is						
$SnO_2 + H_2 \rightarrow Sn + H_2O$									
🗖 a. 1	☑ b. 2	<b>c</b> . 3	🖵 d. 4						
24. Which of these s	substances is formed by	electron transferring b	etween atoms?						
☑ a. FeF <sub>2 (s)</sub>	□ b. CCl <sub>4 (g)</sub>	$\Box$ c. SO <sub>3 (g)</sub>	□ d. CH <sub>4 (g)</sub>						
25. Which set of coe	efficients will correctly b	alance the following eq	uation?						
	Fe +	$0_2 \rightarrow \dots \mathbf{F} \mathbf{e}_2 0_3$							
☑ a. 4, 3, 2	□ b. 2, 3, 4	<b>c</b> . 3, 2, 1	🗖 d. 4, 2, 3						
26. The Lewis dot s	ymbol for the Cl <sup>-</sup> ion is								
□ a. <sup>:</sup> Ċ!: <sup>-</sup>	□ b. <sup>;</sup> Cl·	□ c. <sup>:C1−</sup>	⊠ d. :Ċ:-						
27. How many no	nbonding and bonding	g pairs of electrons a	re there in a nitrogen						
molecule, N <sub>2</sub> ?									
🗖 a. 4 nonbonding p	airs, 6 bonding pairs	b. 3 nonbonding pa	irs, 2 bonding pairs						
☑ c. 2 nonbonding pa	airs, 3 bonding pairs	d. 0 nonbonding pa	irs, 3 bonding pairs						
28. Which bond is f	ormed as a result of une	qual sharing of electron	ns between two atoms of						
different elements?	,								
🗖 a. ionic	b. pure covalent	🗹 c. polar covalent	🗖 d. metallic						
29. Which of the fol	lowing bonds is the sho	rtest yet strongest?							
□ a. C=C	⊠ b. C≡C	□ c. C−C	🖵 d. C–H						
30. How many mole	es of NO <sub>2</sub> will be formed	when 15 moles of N <sub>2</sub> O <sub>5</sub> (	completely dissociate?						
	$2 N_2 O_5 (g) \rightarrow$	4 NO <sub>2 (g)</sub> + O <sub>2 (g)</sub>							
⊠ a. 30	□ b. 15	<b>c</b> . 60	🖵 d. 8						
	and - Arrest in								
CHEM 101 – Mock Test for	r Quiz No.2 – 2 <sup>™</sup> Sem (1441 H)		Page <b>5</b> of <b>6</b>						

31. Calculate the theoretical yield (in mol) for NO, when 5 moles of  $NH_3$  react with 4 moles of O<sub>2</sub>, according to the following equation:  $4 \text{ NH}_3 + 5 \text{ O}_2 \rightarrow 4 \text{ NO} + 6 \text{ H}_2\text{ O}$ ☑ a. 3.2 mol **b**. 5.0 mol **c**. 4.8 mol **d**. 4.0 mol 32. What is the mass (in g) of NaCl required to make 430 mL of a 1.5 M NaCl solution?. **a**. 0.645 g ☑ b. 37.7 g **c**. 3.77 g **d** d. 645 g 33. What is the percent yield for a reaction if its theoretical yield is 123 g and its actual yield is 95 g? **a**. 95.00 % **b** 56.94 % **c**. 47.96 % ☑ d. 77.23 % 34. What is the molarity of a solution if 3.4 moles of NaBr are dissolved in water to make **1.8 L solution? a**. 2.5 M ☑ b. 1.89 M **C** c. 4.4 M **d** d. 3.1 M 35. What is the molarity of KCl solution prepared by diluting 300.0 mL of 3.00 M KCl to a total volume of 1.2 L?

**a**. 0.43 M **b**. 3.12 M ☑ c. 0.75 M 🖵 d. 1.21 M 36. What is the oxidation number of Cr in  $Cr_2O_7^{2-2}$ ? 🗖 a. +2 **b**. +4 ⊠ d. +6 **c**. +5 37. In the following reaction; which element is oxidized?  $Pb(NO_3)_{2(aq)} + Na_2SO_{4(aq)} \rightarrow PbSO_{4(s)} + 2 NaNO_{3(aq)}$ a. Pb **C** C. S 🗹 d. None **b**. N **38. Identify the oxidizing agent in the following redox reaction:**  $Sn_{(s)} + 2H^+_{(aq)} \rightarrow Sn^{2+}_{(aq)} + H_{2(g)}$ 

39. Which of the following substances gives the strongest electrolyte when dissolved in water?

☑ c. H+

 $\Box a. HF \qquad \ \ \Box b. Na_2CO_3 \qquad \ \ \Box c. NH_3 \qquad \ \ \Box d. C_6H_{12}O_6$ 

**Best Wishes** 

 $\Box$  d. H<sub>2</sub>

Al-Madinah, 24<sup>th</sup> of March, 2020

CHEM 101 – Mock Test for Quiz No.2 – 2<sup>nd</sup> Sem (1441 H)

**b**. Sn<sup>2+</sup>

🗖 a. Sn

Page 6 of 6