



Taibah University

Deanery of Academic Services

Unified Scientific Track

CHEM 101 - Quiz No. 2 - Exam Info (2st Sem, 1441)

- Allowed Time: 75 min
- Campuses: all (M & F)
- Chapters included: 2, 3 and 4 (**Topics 07 – 15 only**)
- Number of questions: 25 MCQ's (Electronic)
- Marks: 25 (of a total of 100)
- Scientific calculator: allowed
- Translation aid: not allowed
- Periodic table & suppl. data: provided

Mock Test For

Quiz No. 2

Introduction to Chemistry (CHEM 101)

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

Topics 07 – 15

For

Unified Scientific Track Students

(All Campuses)

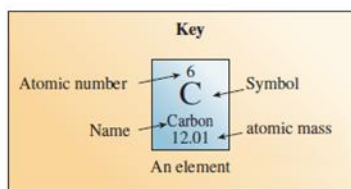
2nd Semester

1441 | 2019 – 2020

▲ Periodic Table of the Elements

Period number
Main group
Group number

Main group



	1A 1	2A 2											3A 13	4A 14	5A 15	6A 16	7A 17	8A 18	
1	1 H Hydrogen 1.008																	2 He Helium 4.003	1
2	3 Li Lithium 6.941	4 Be Beryllium 9.012											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	2
3	11 Na Sodium 22.99	12 Mg Magnesium 24.31	Transition metals										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	3
4	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 65.41	31 Ga Gallium 69.72	32 Ge Germanium 72.64	33 As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.80	4
5	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 101.1	45 Rh Rhodium 102.9	46 Pd Palladium 106.4	47 Ag Silver 107.9	48 Cd Cadmium 112.4	49 In Indium 114.8	50 Sn Tin 118.7	51 Sb Antimony 121.8	52 Te Tellurium 127.6	53 I Iodine 126.9	54 Xe Xenon 131.3	5
6	55 Cs Cesium 132.9	56 Ba Barium 137.3	57 La Lanthanum 138.9	72 Hf Hafnium 178.5	73 Ta Tantalum 180.9	74 W Tungsten 183.8	75 Re Rhenium 186.2	76 Os Osmium 190.2	77 Ir Iridium 192.2	78 Pt Platinum 195.1	79 Au Gold 197.0	80 Hg Mercury 200.6	81 Tl Thallium 204.4	82 Pb Lead 207.2	83 Bi Bismuth 209.0	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)	6
7	87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	104 Rf Rutherfordium (267)	105 Db Dubnium (268)	106 Sg Seaborgium (271)	107 Bh Bohrium (272)	108 Hs Hassium (270)	109 Mt Meitnerium (276)	110 Ds Darmstadtium (281)	111 Rg Roentgenium (280)	112 Cn Copernicium (285)	113 Nh Nihonium (284)	114 Fl Flerovium (289)	115 Mc Moscovium (288)	116 Lv Livermorium (293)	117 Ts Tennessine (293)	118 Og Oganesson (294)	7

Lanthanides 6	58 Ce Cerium 140.1	59 Pr Praseodymium 140.9	60 Nd Neodymium 144.2	61 Pm Promethium (145)	62 Sm Samarium 150.4	63 Eu Europium 152.0	64 Gd Gadolinium 157.3	65 Tb Terbium 158.9	66 Dy Dysprosium 162.5	67 Ho Holmium 164.9	68 Er Erbium 167.3	69 Tm Thulium 168.9	70 Yb Ytterbium 173.0	71 Lu 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.

$d = \frac{m}{V}$	$^{\circ}\text{C} = \frac{(^{\circ}\text{F} - 32)}{1.8}$	$^{\circ}\text{F} = [1.8 \times (^{\circ}\text{C})] + 32$	$^{\circ}\text{C} = \text{K} - 273.15$	$\text{K} = ^{\circ}\text{C} + 273.15$
$M = \frac{n}{V}$	$M_1 V_1 = M_2 V_2$	$K_w = [\text{H}_3\text{O}^+] \times [\text{OH}^-] = 1 \times 10^{-14}$		$\text{pH} = -\log [\text{H}_3\text{O}^+]$
Molecular formula = empirical formula $\times n$ $n = \frac{\text{molar mass of molecular formula}}{\text{molar mass of empirical formula}}$	$\% \text{ mass of element X} = \frac{\text{mass of element X in 1 mol of compound}}{\text{mass of 1 mol of the compound}} \times 100\%$			$\% \text{ yield} = \frac{\text{actual yield}}{\text{theoretical yield}} \times 100$
$q = C \times \Delta T$	$w = -P\Delta V$	$q = m \times C_s \times \Delta T$	1 L.atm = 101.3 J	Avogadro's No. = 6.022×10^{23}
Atomic mass = $\sum_n (\text{fraction of isotope } n) \times (\text{mass of isotope } n)$ = (fraction of isotope 1 \times mass of isotope 1) + (fraction of isotope 2 \times mass of isotope 2) + ...		Mole Conversions: <div style="display: flex; align-items: center; justify-content: center; gap: 20px;"> <div style="border: 1px solid black; padding: 5px;">Grams of Substance</div> <div style="text-align: center;"> \div Molar Mass \longleftarrow \times Molar Mass </div> <div style="border: 1px solid black; padding: 5px;">Moles of Substance</div> <div style="text-align: center;"> \times Avo. Number \longleftarrow \div Avo. Number </div> <div style="border: 1px solid black; padding: 5px;">Number of Atoms or Molecules</div> </div>		

Answer the following questions:

1. Which of these elements has the smallest atomic radius?

- a. Ne b. O 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 energy of "Ca" is lower than the ionization energy of

- a. K b. Ba c. Be d. Ra
-

4. The elements with the lowest electron affinity are the

- a. alkaline earth metals. b. alkali metals.
 c. halogens d. nonmetals
-

5. As we move from bottom to top, and from left to right on the periodic table;

- a. atomic radius increases & ionization energy increases.
 b. atomic radius decreases & ionization energy increases.
 c. atomic radius increases & ionization energy decreases.
 d. atomic radius decreases & ionization energy decreases.
-

6. Which of the following elements has the largest atomic radius?

- a. Ra b. Ca c. Be d. Ba
-

7. Among the following elements; the most electronegative one is

- a. Si b. Al c. Mg d. S
-

8. What is the empirical formula of the compound $C_2H_4O_2$?

- a. CHO b. CH_2O c. $C_2H_2O_2$ d. $C_2H_4O_2$
-

9. Identify the type of the substance CO.

- a. atomic element b. ionic compound
 c. molecular compound d. molecular element
-

10. What is systematic name of $Cu_3(PO_4)_2$?

- a. tricopper diphosphate b. copper(II) phosphate
 c. copper(I) phosphorus oxide d. copper(II) phosphide
-

11. Choose the correct systematic name of the compound CCl_4 .

- a. monocarbon tetrachloride b. carbon tetrachloride
 c. tetrachloride monocarbon d. carbon trichloride
-

12. Give the correct formula of ammonium sulfate.

- a. $\text{SO}_4(\text{NH}_4)_2$ b. $(\text{NH}_4)_2\text{SO}_4$ c. NH_4SO_4 d. $(\text{NH}_4)_2\text{SO}_3$
-

13. Indicate the formula of sulfite ion.

- a. S^{2-} b. SO_4^{2-} c. SO_3^{2-} d. SO_3^{1-}
-

14. Name the compound $\text{HBr}_{(aq)}$.

- a. hydrogen monobromide b. hydrobromide
 c. hydrogen monobromic acid d. hydrobromic acid
-

15. Calculate the molar mass of the compound $(\text{NH}_4)_3\text{PO}_4$.

- a. 149.09 g/mol b. 94.97 g/mol c. 113.01 g/mol d. 203.13 g/mol
-

16. How many moles of $(\text{NH}_4)_2\text{S}$ are there in 34.07 g of $(\text{NH}_4)_2\text{S}$?

- a. 0.3 mol b. 0.5 mol c. 1.2 mol d. 2.3 mol
-

17. How many moles and how many atoms of Rb are there in a sample weighing 30 g?

- a. 0.53 mol and 1.14×10^{24} atoms b. 1.12 mol and 1.12×10^{23} atoms
 c. 3.51 mol and 3.20×10^{23} atoms d. 0.35 mol and 2.11×10^{23} atoms
-

18. How many molecules are there in 110 g of chlorine gas?

- a. 1.87×10^{24} molecules b. 9.34×10^{23} molecules
 c. 7.12×10^{23} molecules d. 4.42×10^{23} molecules
-

19. Calculate the mass percent of oxygen in the compound $\text{Fe}(\text{OH})_3$.

- a. 76.66 % b. 44.91 % c. 52.26 % d. 21.96 %
-

20. Find the empirical formula of a compound consisting of 21.96 % S and 78.04 % F.

- a. SF b. SF_2 c. SF_4 d. SF_6
-

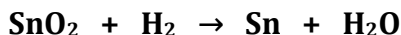
21. What is the empirical formula of a compound that contains 50.05 % sulfur and 49.95 % oxygen (mass percent)?

- a. SO_3 b. SO_2 c. SO d. S_6O_2
-

22. A compound has a molar mass of 515.46 g/mol. What is the molecular formula of this compound if its empirical formula is CBr₂?

- a. CBr₄ b. C₄Br₈ c. C₃Br₆ d. C₂Br₄
-

23. When the following equation is balanced, the coefficient of H₂O is

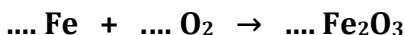


- a. 1 b. 2 c. 3 d. 4
-

24. Which of these substances is formed by electron transferring between atoms?

- a. FeF₂ (s) b. CCl₄ (g) c. SO₃ (g) d. CH₄ (g)
-

25. Which set of coefficients will correctly balance the following equation?



- a. 4, 3, 2 b. 2, 3, 4 c. 3, 2, 1 d. 4, 2, 3
-

26. The Lewis dot symbol for the Cl⁻ ion is

- a. $\text{:}\ddot{\text{Cl}}\text{:}^-$ b. $\text{:}\ddot{\text{Cl}}\cdot$ c. $\text{:}\text{Cl}^-$ d. $\text{:}\ddot{\text{Cl}}^-$
-

27. How many nonbonding and bonding pairs of electrons are there in a nitrogen molecule N₂?

- a. 4 nonbonding pairs, 6 bonding pairs b. 3 nonbonding pairs, 2 bonding pairs
 c. 2 nonbonding pairs, 3 bonding pairs d. 0 nonbonding pairs, 3 bonding pairs
-

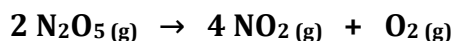
28. Which bond is formed as a result of unequal sharing of electrons between two atoms of different elements?

- a. ionic b. pure covalent c. polar covalent d. metallic
-

29. Which of the following bonds is the shortest yet strongest?

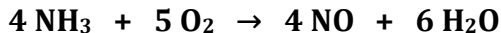
- a. C=C b. C≡C c. C-C d. C-H
-

30. How many moles of NO₂ will be formed when 15 moles of N₂O₅ completely dissociate?



- a. 30 b. 15 c. 60 d. 8
-

31. Calculate the theoretical yield (in mol) for NO, when 5 moles of NH₃ react with 4 moles of O₂, according to the following equation:



- 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. 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. 4.4 M d. 3.1 M
-

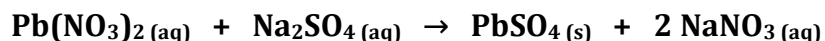
35. What is the molarity of KCl solution prepared by diluting 300.0 mL of 3.00 M KCl to a total volume of 1.2 L?

- 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 Cr₂O₇²⁻?

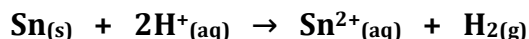
- a. +2 b. +4 c. +5 d. +6
-

37. In the following reaction; which element is oxidized?



- a. Pb b. N c. S d. None
-

38. Identify the oxidizing agent in the following redox reaction:



- a. Sn b. Sn²⁺ c. H⁺ d. H₂
-

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

- a. HF b. Na₂CO₃ c. NH₃ d. C₆H₁₂O₆
-

Best Wishes

Al-Madinah, 24th of March, 2020