

**CHEM 101 - CHEM 103**  
**FERST SEMESTER**  
**SECOND MIDTERM EXAM**  
**1440-1441H / 2019-2020G**



|                           |                                      |      |      |      |
|---------------------------|--------------------------------------|------|------|------|
| Student's Name: .....     | Write your answer in the table below |      |      |      |
|                           | Q1:                                  | Q6:  | Q11: |      |
| Student ID No. ....       | Q2:                                  | Q7:  | Q12: |      |
| Group No. ....            | Q3:                                  | Q8:  | Q13: |      |
| Sunday 27/03/1441H        | 07:00-08:30 pm                       | Q4:  | Q9:  | Q14: |
| Time allowed : 90 minutes | Q5:                                  | Q10: | Q15: |      |

|                       |                        |  |                    |                    |                    |                    |                    |                    |                    |                    |                     |                           |                         |                        |                         |                          |                           |
|-----------------------|------------------------|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------------|-------------------------|------------------------|-------------------------|--------------------------|---------------------------|
| IA<br>1<br>H<br>1.008 | 2<br>IIA<br>Li<br>6.94 | key                                      |                    |                    |                    |                    |                    |                    |                    |                    |                     | 13<br>IIIA<br>B<br>10.811 | 14<br>IVA<br>C<br>12.01 | 15<br>VA<br>N<br>14.01 | 16<br>VIA<br>O<br>16.00 | 17<br>VIIA<br>F<br>19.00 | VIIIA<br>2<br>He<br>4.003 |
| 3<br>Li<br>6.94       | 4<br>Be<br>9.01        | atomic number<br>symbol<br>atomic weight |                    |                    |                    |                    |                    |                    |                    |                    |                     | 5<br>B<br>10.811          | 6<br>C<br>12.01         | 7<br>N<br>14.01        | 8<br>O<br>16.00         | 9<br>F<br>19.00          | 10<br>Ne<br>20.18         |
| 11<br>Na<br>23.00     | 12<br>Mg<br>24.31      | 3<br>IIIB                                | 4<br>IVB           | 5<br>VB            | 6<br>VIB           | 7<br>VIIB          | 8                  | 9<br>VIII B        | 10                 | 11<br>IB           | 12<br>IIB           | 13<br>Al<br>26.98         | 14<br>Si<br>28.09       | 15<br>P<br>30.97       | 16<br>S<br>32.07        | 17<br>Cl<br>35.45        | 18<br>Ar<br>39.98         |
| 19<br>K<br>39.09      | 20<br>Ca<br>40.08      | 21<br>Sc<br>44.96                        | 22<br>Ti<br>47.87  | 23<br>V<br>50.94   | 24<br>Cr<br>52.00  | 25<br>Mn<br>54.94  | 26<br>Fe<br>55.85  | 27<br>Co<br>58.93  | 28<br>Ni<br>58.69  | 29<br>Cu<br>63.546 | 30<br>Zn<br>65.41   | 31<br>Ga<br>69.72         | 32<br>Ge<br>72.64       | 33<br>As<br>74.9216    | 34<br>Se<br>78.96       | 35<br>Br<br>79.90        | 36<br>Kr<br>83.80         |
| 37<br>Rb<br>85.47     | 38<br>Sr<br>87.62      | 39<br>Y<br>88.91                         | 40<br>Zr<br>91.23  | 41<br>Nb<br>92.91  | 42<br>Mo<br>95.94  | 43<br>Tc<br>[98]   | 44<br>Ru<br>101.07 | 45<br>Rh<br>102.91 | 46<br>Pd<br>106.42 | 47<br>Ag<br>107.87 | 48<br>Cd<br>112.41  | 49<br>In<br>114.82        | 50<br>Sn<br>118.71      | 51<br>Sb<br>121.760    | 52<br>Te<br>127.60      | 53<br>I<br>126.90        | 54<br>Xe<br>131.29        |
| 55<br>Cs<br>132.91    | 56<br>Ba<br>137.33     | 71<br>Lu<br>174.97                       | 72<br>Hf<br>178.49 | 73<br>Ta<br>180.95 | 74<br>W<br>183.84  | 75<br>Re<br>186.21 | 76<br>Os<br>190.23 | 77<br>Ir<br>192.22 | 78<br>Pt<br>195.08 | 79<br>Au<br>196.97 | 80<br>Hg<br>200.59  | 81<br>Tl<br>204.38        | 82<br>Pb<br>207.2       | 83<br>Bi<br>208.980    | 84<br>Po<br>[209]       | 85<br>At<br>[210]        | 86<br>Rn<br>[222]         |
| 87<br>Fr<br>[223]     | 88<br>Ra<br>[226]      | 103<br>Lr<br>[262]                       | 104<br>Rf<br>[261] | 105<br>Db<br>[262] | 106<br>Sg<br>[266] | 107<br>Bh<br>[264] | 108<br>Hs<br>[269] | 109<br>Mt<br>[268] | 110<br>Ds<br>[271] | 111<br>Rg<br>[272] | 112<br>Uub<br>[285] | 113<br>Uut<br>[286]       |                         |                        |                         |                          |                           |

**Constants:**

$$1 \text{ atm} = 760 \text{ torr}$$

$$R = 0.082 \text{ atm L mol}^{-1} \text{ K}^{-1} = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$$

$$N_A (\text{Avogadro's Number}) = 6.022 \times 10^{23} \text{ mol}^{-1}$$

$$1 \text{ L} \cdot \text{atm} = 101.3 \text{ J}$$

Q1. Number of molecules in 154 g of carbon dioxide "CO<sub>2</sub>" is:

- A) 3.5      **B)  $2.11 \times 10^{24}$**       C)  $4.21 \times 10^{24}$       D)  $9.27 \times 10^{25}$
- 

Q2. The percent, by mass, of chromium "Cr" in K<sub>2</sub>CrO<sub>4</sub> is:

- A) 26.8**      B) 31.8      C) 40.3      D) 42.2
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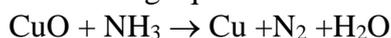
Q3. A sample of "C<sub>7</sub>H<sub>5</sub>N<sub>3</sub>O<sub>4</sub>" has a mass of 7.81 g, the mass in (g) of oxygen atoms "O" in this sample is:

- A) 31.2      **B) 2.56**      C) 1.75      D) 64.0
- 

Q4. A compound has an empirical formula of CH<sub>2</sub>Cl. Its molar mass is 198 g/mol. The molecular formula of the compound is:

- A) C<sub>4</sub>H<sub>2</sub>Cl<sub>2</sub>      **B) C<sub>4</sub>H<sub>8</sub>Cl<sub>4</sub>**      C) C<sub>2</sub>H<sub>5</sub>Cl<sub>4</sub>      D) C<sub>4</sub>H<sub>4</sub>Cl<sub>4</sub>
- 

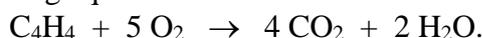
Q5. When the following equation is balanced:



The coefficient of "NH<sub>3</sub>"

- A) 3      B) 1      **C) 2**      D) 4
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Q6. Given the following equation:



If 0.3618 moles of C<sub>4</sub>H<sub>4</sub> are allowed to react with 1.818 moles of O<sub>2</sub>, the mass of water in (g) that could be produced is

- A) 11.021      **B) 13.02**      C) 13.20      D) 19.64
- 

Q7. A gas-evolved volume was found to be 25.0l L at 295.5 K and 702 mmHg. The moles of the gas were:

- A) 0.95**      B) 1.05      C) 12.5      D) 22.4
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Q8. The density in (g/L) of "CO<sub>2</sub>" (g) at 120 °C and 790 torr pressure is:

- A) 8.0      B) 3.4      **C) 1.42**      D) 1.8
- 

Q9. The mass in "g" of "CO<sub>2</sub>" gas present at STP in a 5.9 L container are:

- A) 0.24      B) 0.26      C) 17.0      **D) 11.58**
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Q10. The highest average kinetic energy among this (H<sub>2</sub>, N<sub>2</sub> and Cl<sub>2</sub>) at 25 °C is:

- A) H<sub>2</sub>  
B) N<sub>2</sub>  
C) Cl<sub>2</sub>  
**D) All the gases have the same average kinetic energy.**
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