

CHEM 101 - CHEM 103

SECOND SEMESTER

SECOND MIDTERM EXAM

1438-1439H / 2017-2018G



COLLEGE OF SCIENCE

Chemistry Department

| | | | |
|---------------------------|--------------------------------------|------|------|
| 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 22/07/1439H | 07:00-08:30 pm | Q4: | Q9: |
| Time allowed : 90 minutes | Q5: | Q10: | Q15: |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|------------------------|--------------------------|-------------------------|------------------------|-------------------------|-------------------------|----------------------------|----------------------------|-----------------------------|-------------------------|--------------------------|----------------------------|--------------------------|-------------------------|--------------------------|-----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------|-------------------|
| IA 1 H 1.008 | 2 IIA Li 6.94 | 3 IIIB Na 23.00 | 4 IVB Mg 24.31 | 5 VB Sc 44.96 | 6 VIB Ti 47.87 | 7 VIIB V 50.94 | 8 VIII B Cr 52.00 | 9 VIII B Mn 54.94 | 10 VIII B Fe 55.85 | 11 IB Co 58.93 | 12 IIB Ni 58.69 | 13 IIIA Cu 63.546 | 14 IVA Zn 65.41 | 15 VA Ga 69.72 | 16 VIA Ge 72.64 | 17 VIIA As 74.9216 | 18 VIIA Se 78.96 | 19 VIIA Br 79.90 | 20 VIIA Kr 83.80 | VIIIA 2 He 4.003 | | | | | | | | | | | | | | | |
| 11 Na 23.00 | 12 Mg 24.31 | 13 Al 26.98 | 14 Si 28.09 | 15 P 30.97 | 16 S 32.07 | 17 Cl 35.45 | 18 Ar 39.98 | 19 K 39.09 | 20 Ca 40.08 | 21 Sc 44.96 | 22 Ti 47.87 | 23 V 50.94 | 24 Cr 52.00 | 25 Mn 54.94 | 26 Fe 55.85 | 27 Co 58.93 | 28 Ni 58.69 | 29 Cu 63.546 | 30 Zn 65.41 | 31 Ga 69.72 | 32 Ge 72.64 | 33 As 74.9216 | 34 Se 78.96 | 35 Br 79.90 | 36 Kr 83.80 | | | | | | | | | | |
| 37 Rb 85.47 | 38 Sr 87.62 | 39 Y 88.91 | 40 Zr 91.23 | 41 Nb 92.91 | 42 Mo 95.94 | 43 Tc [98] | 44 Ru 101.07 | 45 Rh 102.91 | 46 Pd 106.42 | 47 Ag 107.87 | 48 Cd 112.41 | 49 In 114.82 | 50 Sn 118.71 | 51 Sb 121.760 | 52 Te 127.60 | 53 I 126.90 | 54 Xe 131.29 | 55 Cs 132.91 | 56 Ba 137.33 | 57 Lu 174.97 | 58 Hf 178.49 | 59 Ta 180.95 | 60 W 183.84 | 61 Re 186.21 | 62 Os 190.23 | 63 Ir 192.22 | 64 Pt 195.08 | 65 Au 196.97 | 66 Hg 200.59 | 67 Tl 204.38 | 68 Pb 207.2 | 69 Bi 208.980 | 70 Po [209] | 71 At [210] | 72 Rn [222] |
| 87 Fr [223] | 88 Ra [226] | 89 Lr [262] | 90 Rf [261] | 91 Db [262] | 92 Sg [266] | 93 Bh [264] | 94 Hs [269] | 95 Mt [268] | 96 Ds [271] | 97 Rg [272] | 98 Uub [285] | 99 Uut [286] | 100 Uuq [287] | 101 Uuq [288] | 102 Uuq [289] | 103 Uuq [290] | 104 Uuq [291] | 105 Uuq [292] | 106 Uuq [293] | 107 Uuq [294] | 108 Uuq [295] | 109 Uuq [296] | 110 Uuq [297] | 111 Uuq [298] | 112 Uuq [299] | 113 Uuq [300] | 114 Uuq [301] | 115 Uuq [302] | 116 Uuq [303] | 117 Uuq [304] | 118 Uuq [305] | 119 Uuq [306] | 120 Uuq [307] | | |

Constants:

1 atm = 760 torr

R = 0.082 atm L mol⁻¹ K⁻¹

N_A (Avogadro's Number) = 6.022 × 10²³ mol⁻¹

Q1: When the following equation is balanced:



the coefficient of "CuO", is:

- A) 3
- B) 2
- C) 1
- D) 4

Q2: The mass in "g" of "C" present in 5.0 g of "C₃H₃N₃O₉F₂" (molar mass = 263 g/mol), is:

- A) 2.74
- B) 0.06
- C) 0.68
- D) 0.80

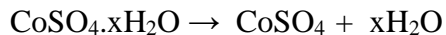
Q3: The number of "C" atoms present on 1.0 kg of [C₆H₁₂N₂O₄Pt] (molar mass = 371 g/mol), is:

- A) 6.49×10^{24}
- B) 9.73×10^{24}
- C) 1.95×10^{25}
- D) 3.24×10^{24}

Q4: The empirical formula of a compound containing 19.36% Ca, 34.26% Cl and 46.38% O by mass, is:

- A) CaCl₂O₃
- B) CaCl₂O₄
- C) CaCl₃O₄
- D) CaCl₂O₆

Q5: When 5.80 g of "CoSO₄.xH₂O" were heated until all of the water "xH₂O" was driven off and 3.20 g of "CoSO₄" were left over. The value of "x" is:

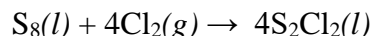


- A) 5
- B) 4
- C) 7
- D) 6

Q6: A 0.8715 g of a compound is burned completely in oxygen to give 2.053 g of "CO₂" and 0.5601 g of "H₂O". The empirical formula of this compound, is:

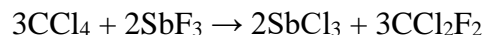
- A) C₃H₄O
- B) C₉H₁₂O₃
- C) C₆H₈O₂
- D) C₄H₁₀O₂

Q7: What is the mass of "Cl₂" in "g" needed to react completely with 22.5 g of "S₈" ?



- A) 99.68
- B) 24.96
- C) 49.74
- D) 74.88

Q8: According to:



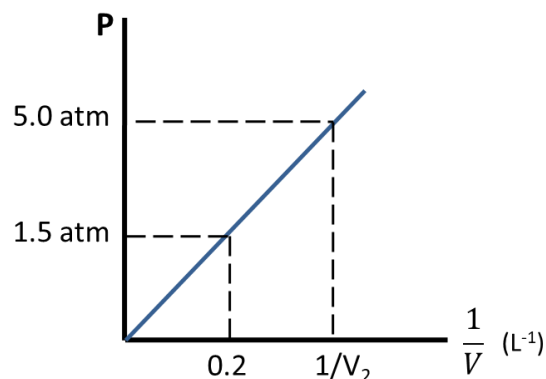
If 146.0 kg of "SbF₃" were allowed to react with an excess of "CCl₄", producing 117.0 kg of "CCl₂F₂". The percentage yield (%) of "CCl₂F₂", is:

- A) 29.1
- B) 63.7
- C) 96.3
- D) 78.9

Q9: 5 g of "CO" occupied 5.0 L at 25 °C. If the temperature increased to 120 °C at constant pressure, the gas volume in "L" will be:

- A) 6.6
- B) 8.3
- C) 9.9
- D) 11.6

Q10: The diagram below shows the change in "P" with "1/V" of an ideal gas at constant "T" and "n":



The final volume "V" in "L" is:

- A) 2.5
- B) 1.0
- C) 0.75
- D) 1.5

Q11: A gas initially at STP is raised to 250°C at constant volume. The final pressure of the gas in "atm", is:

- A) 1.55
- B) 2.65
- C) 1.92
- D) 2.28

Q12: The volume of an ideal gas sample measured at STP is 8.3 L. If the temperature of this gas sample is raised to 30°C and its pressure is reduced to 0.8 atm, the volume in "L" will be:

- A) 46.1
- B) 11.5
- C) 15.4
- D) 23.0

Q13: The density in "g/L" of "CCl₂F₂" gas at STP, is:

- A) 5.4
- B) 0.2
- C) 2.7
- D) 1.3

Q14: A sample of gas mixture contains 50 g of "CO" and 50 g of "CO₂". If the partial pressures of "CO" 568 mmHg, the total pressure of this sample in "mmHg" is:

- A) 772
- B) 687
- C) 929
- D) 838

Q15: A compound contains 36.84% "N" and 63.16% "O" by mass. If 3.61 g of this compound exerted a pressure of 1.2 atm when put in a 0.5 L container at 35°C, what is the molecular formula of the compound ?

- A) N₆O₄
- B) N₃O₂
- C) N₂O₃
- D) N₄O₆