160) Which of the following compounds has its oxygen composition equal to 50.0%?

A) (NH4)2CO3

B) CH2O2

C) C2H3NO2

D) C10H20ONS

Answer: A

Section: Section 9.6

Learning Outcome: 9.5 Calculate % by mass elemental compositions from a molecular formula.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

161) Which of the following compounds has its nitrogen composition equal to 29.2%?

A) C2H3NO2

B) C10H20ONS

C) (NH4)2CO3

D) N2H4

Answer: C

Section: Section 9.6

Learning Outcome: 9.5 Calculate % by mass elemental compositions from a molecular formula.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

134) Which compound has the percent composition of 15.8% Al, 28.1% S and 56.1% O?

A) Al2(SO4)3

B) Al2(SO3)3

C) Al2S3

D) Al2(S2O3)3

Answer: A

Section: Section 9.5

Learning Outcome: 9.4 Calculate a compound's empirical and actual formula from % by mass elemental compositions.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

135) A chromium-silicon compound contains 73.52% chromium. The empirical formula is \_\_\_\_\_\_\_\_.

A) CrSi

B) CrSi2

C) Cr2Si

D) Cr3Si2

Answer: D

Section: Section 9.5

Learning Outcome: 9.4 Calculate a compound's empirical and actual formula from % by mass elemental compositions.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

133) A sample is composed of 2.78 g of iron and 1.19 g of oxygen. The empirical formula is \_\_\_\_\_\_\_\_.

A) FeO2

B) Fe2O5

C) Fe2O3

D) FeO

Answer: C

Section: Section 9.5

Learning Outcome: 9.4 Calculate a compound's empirical and actual formula from % by mass elemental compositions.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

18) Alkenes have the general molecular formula CnH2n. Thus, when n = 2, the alkene is C2H4. If an alkene has a molecular mass between 65 and 75, this alkene is \_\_\_\_\_\_\_\_.

A) C5H12

B) C5H10

C) C6H3

D) C6H12

Answer: B

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

1) What is the mass in grams of 1.000 mole of P2O5?

A) 239.03 g

B) 61.96 g

C) 142.0 g

D) 46.98 g

Answer: C

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

2) What is the mass in grams of 1.000 mole of a compound whose formula is C3H7O2?

A) 29.14 g

B) 68.22 g

C) 37.54 g

D) 75.09 g

Answer: D

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

3) Which of the following has the least number of atoms?

A) (NH4)3PO4

B) Na2P2O3

C) (NH4)2Cr2O7

D) K4Fe(CNO)6

Answer: B

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

4) Which of the following has the greatest number of atoms?

A) (NH4)3PO4

B) Na2P2O3

C) (NH4)2Cr2O7

D) K4Fe(CNO)6

Answer: D

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

5) The correct sequence of decreasing number of atoms per formula unit in the following is \_\_\_\_\_\_\_\_.

A) (NH4)3PO4 > Na2P2O3 > Na3PO4

B) Na3PO4 > (NH4)3PO4 > Na2P2O3

C) Na2P2O3 > Na3PO4 > (NH4)3PO4

D) (NH4)3PO4 > Na3PO4 > Na2P2O3

Answer: D

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

6) The number of oxygen atoms in 1 mole of Al2(SO4)3 is \_\_\_\_\_\_\_\_.

A) 3

B) 4

C) 12

D) none of the above

Answer: D

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

7) The molar mass of Ca3(PO4)2 is \_\_\_\_\_\_\_\_.

A) 310

B) 279

C) 246

D) 215

Answer: A

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

8) The molar mass for Pb(CO3)4 is \_\_\_\_\_\_\_\_.

A) 447

B) 409

C) 327

D) 303

Answer: A

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

9) Which of the following has a molar mass equal to 133?

A) (NH4)3PO3

B) Ca3(PO4)2

C) Al2(SO3)3

D) Co2(CO3)2

Answer: A

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

10) Which of the following has the highest molar mass?

A) (NH4)3PO3

B) Ca3(PO4)2

C) Al2(SO3)3

D) Co2(CO3)2

Answer: C

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

11) Which of the following pairs does **not** share the same molecular mass when rounded to the nearest whole number?

A) CH3OH and oxygen gas

B) CO and nitrogen gas

C) C2H6O and C2H4O2

D) C4H10O and C3H6O2

Answer: C

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

12) The molar mass of a compound XClO3 is 106.5. The molar mass (rounded to the nearest whole number) of X is \_\_\_\_\_\_\_\_, which is \_\_\_\_\_\_\_\_.

A) 39; K

B) 23; Na

C) 7; Li

D) 1; H

Answer: B

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G2 Demonstrate the ability to think critically and employ critical thinking skills and G4 Demonstrate the quantitative skills needed to succeed in chemistry.

13) The molar mass of a compound X(HCO3)2 is 146. The atomic weight of X when rounded to the nearest whole number is \_\_\_\_\_\_\_\_, which is \_\_\_\_\_\_\_\_.

A) 24; Mg

B) 40; Ca

C) 51; V

D) 56; Fe

Answer: A

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G2 Demonstrate the ability to think critically and employ critical thinking skills and G4 Demonstrate the quantitative skills needed to succeed in chemistry.

14) The molecular mass of a compound X(NO3)3 is 213. The atomic mass of X is \_\_\_\_\_\_\_\_, which is \_\_\_\_\_\_\_\_.

A) 27; Al

B) 51; V

C) 56; Fe

D) 59; Co

Answer: A

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G2 Demonstrate the ability to think critically and employ critical thinking skills and G4 Demonstrate the quantitative skills needed to succeed in chemistry.

15) The molar mass of a compound Ca(MO3)2 is 160. The atomic mass of M is \_\_\_\_\_\_\_\_, which is \_\_\_\_\_\_\_\_.

A) 12; C

B) 14; N

C) 32; S

D) 35; Cl

Answer: A

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G2 Demonstrate the ability to think critically and employ critical thinking skills and G4 Demonstrate the quantitative skills needed to succeed in chemistry.

16) The molar mass of a compound Al2(XO4)3 is 342. The atomic mass of X is \_\_\_\_\_\_\_\_, which is \_\_\_\_\_\_\_\_.

A) 31; P

B) 32; S

C) 52; Cr

D) 55; Mn

Answer: B

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G2 Demonstrate the ability to think critically and employ critical thinking skills and G4 Demonstrate the quantitative skills needed to succeed in chemistry.

17) Alkanes have the general molecular formula CnH2n+2. Thus, when n = 1, the alkane is CH4, when n = 2, the alkane is C2H6 etc. If an alkane has a molar mass between 140 and 150, this alkane is \_\_\_\_\_\_\_\_.

A) C9H20

B) C12H26

C) C10H22

D) C11H24

Answer: C

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

18) Alkenes have the general molecular formula CnH2n. Thus, when n = 2, the alkene is C2H4. If an alkene has a molecular mass between 65 and 75, this alkene is \_\_\_\_\_\_\_\_.

A) C5H12

B) C5H10

C) C6H3

D) C6H12

Answer: B

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.

19) Alkynes have the general molecular formula CnH2n-2. Thus, when n = 2, the alkyne is C2H2 etc. If an alkyne has a molecular mass between 75 and 85, this alkyne is \_\_\_\_\_\_\_\_.

A) C6H10

B) C6H12

C) C5H16

D) C7H12

Answer: A

Section: Section 9.2

Learning Outcome: 9.1 Describe what a mole is and how it relates to formulas of substances, molar mass, and chemical equations.

Global Obj: G4 Demonstrate the quantitative skills needed to succeed in chemistry.