

### Practise Exam Chapter 3

1. The atomic weight of phosphorus is 30.974 u. What is the mass of a phosphorus sample which contains 0.585 moles of phosphorus atoms?
  - A) 17.3 g
  - B) 18.1 g
  - C) 22.3 g
  - D) 26.5 g
  - E) 34.2 g
  
2. What is the correct name for the compound  $S_2Cl_2$ ?
  - A) disulfur chlorate
  - B) disulfur dichloride
  - C) disulfur dichlorine
  - D) sulfur(I) chloride
  - E) sulfur(II) chlorine(II)
  
3. The correct formula for the compound formed from strontium ion and chromate ion is
  - A)  $SrCrO_3$
  - B)  $SrCrO_4$
  - C)  $Sr_2CrO_4$
  - D)  $Sr(CrO_4)_2$
  - E)  $Sr_2(CrO_4)_3$
  
4. A compound contains carbon, hydrogen, and nitrogen as the only elements. A 9.353 g sample of the compound contains 5.217 g of carbon and 1.095 g of hydrogen, the remainder being nitrogen. From this data, after determining the percent composition, by weight, what is the calculated empirical formula for the compound?
  - A)  $C_2H_5N$
  - B)  $C_3H_5N$
  - C)  $C_3H_6N$
  - D)  $C_3H_7N$
  - E)  $C_4H_9N_2$
  
5. What is the correct name for the compound  $Na_2O$ ?
  - A) disodium oxide
  - B) sodium oxide
  - C) sodium(I) oxide
  - D) sodium peroxide
  - E) sodium superoxide

6. Consider the atoms of  ${}^{26}_{12}\text{Mg}$  and  ${}^{27}_{13}\text{Al}$ . Both of these species have the same
- A) number of electrons
  - B) mass
  - C) number of neutrons
  - D) atomic mass number
  - E) number of protons
7. The species shown below which has 24 neutrons is
- A)  ${}^{52}_{24}\text{Cr}$
  - B)  ${}^{55}_{25}\text{Mn}$
  - C)  ${}^{24}_{12}\text{Mg}$
  - D)  ${}^{45}_{21}\text{Sc}$
  - E)  ${}^{51}_{23}\text{V}$
8. Consider the atoms of  ${}^{65}\text{Cu}$  and  ${}^{65}\text{Zn}$ . Both of these atoms have the same
- A) number of electrons
  - B) mass
  - C) number of neutrons
  - D) atomic mass number
  - E) number of protons
9. Naturally occurring silver consists of two isotopes  ${}^{107}\text{Ag}$ , 106.905092 u and  ${}^{109}\text{Ag}$ , 108.904757 u. A meteorite (or more properly, an extra-terrestrial object) which was retrieved from the ocean floor by one of the Explorer vessels contained a high percentage of silver. Oddly however, even though the silver contained the same two isotopes as our natural silver, the average atomic weight of the silver in this object, as verified by several reputable scientific laboratories in the United States and abroad, gave a value of 108.548 u! From this data, calculate the percent of the  ${}^{107}\text{Ag}$  isotope in the object retrieved from the ocean floor.
10. Consider the atoms of  ${}^{59}\text{Co}$  and  ${}^{60}\text{Co}$ . Both of these atoms have the same
- A) number of electrons
  - B) number of neutrons
  - C) atomic mass number
  - D) number of photons
  - E) number of protons

11. What is the correct name for the compound  $\text{BaSeO}_3$ ?
- A) barium selenate
  - B) barium selenide
  - C) barium selenite
  - D) barium selenium trioxide
  - E) barium selenoxate
12. Which one of the pairs below contains elements from the same period?
- A) iron, barium
  - B) potassium, gold
  - C) potassium, barium
  - D) potassium, iron
  - E) tin, bromine
13. The correct name for  $\text{K}_2\text{Cr}_2\text{O}_7$  is potassium dichromium heptaoxide. \_\_\_\_\_
- A) True
  - B) False
14. A new compound contains nitrogen, hydrogen, boron, and fluorine. The assay values are: nitrogen, 13.360%; hydrogen, 3.8455%; boron, 10.312%. Determine its empirical formula.
- A)  $\text{NH}_3\text{BF}_3$
  - B)  $\text{NH}_4\text{B}_3\text{F}$
  - C)  $\text{N}_4\text{HB}_4\text{F}$
  - D)  $\text{NH}_4\text{BF}_4$
  - E)  $\text{NH}_3\text{BF}_4$
15. What is the correct name for the compound  $\text{Na}_2\text{Cr}_2\text{O}_7$ ?
- A) sodium chromium(VII)-ate
  - B) sodium dichromate
  - C) sodium dichromium heptaoxide
  - D) sodium heptaoxochromate
  - E) sodium perchromate

16. In a quantitative analysis study, 2.644 grams of a hydrocarbon (which contains carbon and hydrogen only) sample yielded 8.008 g of  $\text{CO}_2$  and 4.098 g of  $\text{H}_2\text{O}$  in a combustion analysis apparatus. Determine the empirical formula of the hydrocarbon.
- A)  $\text{CH}_3$
  - B)  $\text{CH}_4$
  - C)  $\text{C}_2\text{H}_3$
  - D)  $\text{C}_2\text{H}_5$
  - E)  $\text{C}_3\text{H}_8$
17. The atomic mass of naturally occurring copper, which is a mixture of two isotopes, is listed as 63.546 u. This means that
- A) all copper atoms found in nature have a mass which is 63.546/12.000 times as great as that of a  $^{12}\text{C}$  atom
  - B) all copper atoms found in nature have a mass which is 63.546/1.0079 times as great as that of a  $^1\text{H}$  atom
  - C) some copper atoms found in nature have a mass which is 63.546/12.000 times as great as that of a  $^{12}\text{C}$  atom
  - D) some copper atoms found in nature have a mass which is 63.546/1.0079 times as great as that of a  $^1\text{H}$  atom
  - E) no copper atoms found in nature have a mass which is 63.546/12.000 times as great as that of a  $^{12}\text{C}$  atom
18. A 4.626 gram sample of a hydrocarbon, upon combustion in a combustion analysis apparatus, yielded 6.527 grams of water. The percent, by weight, of hydrogen in the hydrocarbon is therefore:
- A) 14.11 %
  - B) 15.79 %
  - C) 41.09 %
  - D) 66.22 %
  - E) 85.89 %
19. A compound has an empirical formula  $\text{CH}_2$ . An independent analysis gave a value of 70 for its molar mass. What is the correct molecular formula?
- A)  $\text{C}_2\text{H}_4$
  - B)  $\text{C}_3\text{H}_6$
  - C)  $\text{C}_4\text{O}_8$
  - D)  $\text{C}_5\text{H}_{10}$
  - E)  $\text{C}_5\text{H}_{11}$

20. How many moles of carbon atoms are combined with 11.2 moles of hydrogen atoms in a sample of the compound,  $C_3H_8$ ?
- A) 3.00
  - B) 5.60
  - C) 4.20
  - D)  $6.02 \times 10^{23}$
  - E) 29.9
21. When the coefficients in the chemical equation,  $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$ , are calculated after the equation is balanced so that the number of atoms of each kind on the reactant side equals the number of atoms of that kind on the product side, the sum of the smallest set of integer coefficients will be
- A) 11
  - B) 12
  - C) 13
  - D) 17
  - E) 19
22. Which one of the following contains the greatest number of carbon atoms?
- A) 0.250 moles of glucose,  $C_6H_{12}O_6$
  - B) 1.20 moles of carbon dioxide,  $CO_2$
  - C) 0.500 moles of  $CaC_2$
  - D) 0.450 moles of  $Al_2(CO_3)_3$
  - E) 0.350 moles of  $C_4H_8O_2S$
23. When barium metal reacts with chlorine gas it forms an ionic compound,  $BaCl_2$ . In the course of the reaction, each Cl atom
- A) loses one proton
  - B) loses one electron
  - C) gains one proton
  - D) gains one electron
  - E) loses one neutron
24. Which set below includes only alkali metal elements?
- A) gallium, germanium, iron, barium, tellurium
  - B) lithium, sodium, potassium, rubidium, francium
  - C) magnesium, gallium, fluorine, mendelevium, neptunium
  - D) radium, polonium, actinium, platinum, selenium
  - E) uranium, francium, gallium, plutonium, titanium
25. The correct formula for barium sulfite is \_\_\_\_\_

26. Which one of the following compounds is correctly described as a hydrate?
- A)  $\text{CaH}_2$
  - B)  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
  - C)  $\text{H}_2\text{O}$
  - D)  $\text{HCl}$
  - E)  $\text{NaOH}$
27. The symbol "Si" is used to represent the element:
- A) silver
  - B) silicon
  - C) sodium
  - D) sulfur
  - E) silicium
28. The correct formula for the compound formed between antimony(Sb) and hydrogen is
- A)  $\text{SbH}$
  - B)  $\text{SbH}_2$
  - C)  $\text{SbH}_3$
  - D)  $\text{SbH}_4$
  - E)  $\text{SbH}_5$
29. Which one of the following is a correct formula for mercury(I) phosphate?
- A)  $\text{HgPO}_3$
  - B)  $\text{HgPO}_4$
  - C)  $\text{Hg}_3\text{PO}_4$
  - D)  $\text{Hg}_2\text{PO}_3$
  - E)  $(\text{Hg}_2)_3(\text{PO}_4)_2$
30. When the coefficients in the chemical equation,
- $$\text{AsF}_3 + \text{C}_2\text{Cl}_6 \rightarrow \text{AsCl}_3 + \text{C}_2\text{Cl}_2\text{F}_4$$
- are calculated after the equation is balanced so that the number of atoms of each kind on the reactant side equals the number of atoms of that kind on the product side, the sum of the smallest set of integer coefficients will be
- A) 8
  - B) 12
  - C) 13
  - D) 14
  - E) 16

## Answer Key

1. B
2. B
3. B
4. A
5. B
6. C
7. D
8. D
9. 17.840 or 17.841
10. E
11. C
12. D
13. B
14. D
15. B
16. D
17. E
18. B
19. D
20. C
21. C
22. A
23. D
24. B
25.  $\text{BaSO}_3$
26. B
27. B
28. C
29. E
30. D