Chapter 2  Compounds and Chemical Reactions

Multiple Choice

1. Which one of the following elements exists as a diatomic molecule when it is in the free state?
   a. H
   b. He
   c. Li
   d. Be
   e. B

6. The number of atoms in one formula unit of the substance, CO(NH₂)₂, is
   a. 4
   b. 5
   c. 6
   d. 7
   e. 8

11. How many atoms are there in one formula unit of NiSO₄·7H₂O?
   a. 9
   b. 14
   c. 27
   d. 28
   e. 33

22. Which one of the following compounds is correctly described as a hydrate?
   a. CoCl₂·6H₂O
   b. HC₂H₃O₂
   c. NaOH
   d. CaH₂
   e. C₆H₁₂O₆

23. Which one of the following compounds is correctly described as a hydrate?
   a. CaH₂
   b. MgSO₄·7H₂O
   c. H₂O
   d. HCl
   e. NaOH

24. Which one of the following is correctly classified as a hydrocarbon?
   a. C₆H₁₂O₆
   b. C₈H₁₆
   c. HC₂H₃O₂
25. The common name for the compound, CH₄, is
   a. carbon(IV) hydride  
   b. carbon tetrahydride  
   c. hydrocarbonate  
   d. methane  
   e. carbonic acid

27. What is the correct name for the compound IBr₃?
   a. bromic iodide  
   b. iodine bromate  
   c. iodine tribromide  
   d. iodine tribromine  
   e. monoiiodine tribromite

28. What is the correct name for the compound S₂Cl₂?
   a. disulfur chlorate  
   b. disulfur dichloride  
   c. disulfur dichlorine  
   d. sulfur(I) chloride  
   e. sulfur(II) chlorine(II)

29. What is the correct name for the compound HI(g)?
   a. hydriodic acid  
   b. hydrogen monoiodide  
   c. hydrogen iodide  
   d. iodic acid  
   e. monohydrogen monoiodide

30. What is the correct name for the compound HCN(g)?
   a. hydrocarbonitride  
   b. hydrocyanic acid  
   c. hydrogen carbonitride  
   d. hydrogen cyanate  
   e. hydrogen cyanide

31. A typographical error on an exam produced the formula, P₄Se₇, in one of the questions. How would you name this compound?
   a. tetraphosphorus hexaselenide  
   b. tetraphosphorus heptaselenide  
   c. phosphorus heptaselenite  
   d. phosphorus(IV) selenide
32. When barium metal reacts with chlorine gas it forms an ionic compound, BaCl₂. In the course of the reaction, each Ba atom
   a. loses two protons  
   b. loses two electrons  
   c. gains two protons  
   d. gains two electrons  
   e. loses two neutrons

33. When barium metal reacts with chlorine gas it forms an ionic compound, BaCl₂. 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

34. An alkaline earth element, which we will represent by the symbol X, unites with a halogen, which we will represent by the symbol Q. What would be the correct formula of the resulting compound?
   a. XQ  
   b. XQ₂  
   c. XQ₄  
   d. X₂Q  
   e. X₄Q

35. Aluminum unites with a second element, which we will represent by the symbol E, to form a definite compound whose formula is AlE₃. Element E is most probably
   a. an actinide element  
   b. an alkali metal  
   c. a chalcogen  
   d. a halogen  
   e. a transition element

36. The correct formula for the compound formed between arsenic (As) and hydrogen is
   a. AsH  
   b. As₂H  
   c. AsH₂  
   d. As₃H  
   e. AsH₃

37. The correct formula for the compound formed between antimony(Sb) and hydrogen is
   a. SbH  
   b. SbH₂
38. Which one of the following formulas is incorrect because it does not represent a known ionic compound?

a. BaCl₂
b. Al₂F₃
c. NaO₂
d. RbBr
e. CaO

39. What is the correct name for the compound V₂O₅? (Remember, for transition metals . . .)

a. divanadium pentoxide
b. vanadic oxide
c. vanadium(V) oxide
d. vanadium(V) pentoxide
e. vanadous oxide

40. What is the correct name for the compound NaCl₃?

a. sodium chlorate
b. sodium chlorite
c. sodium perchloride
d. sodium trichloride
e. there is no such compound

41. What is the correct name for the compound CuBr₂? (Remember, for transition metals . . .)

a. copper(I) bromide(II)
b. copper(II) bromide
c. copper(II) bromite
d. copper dibromide
e. cuprous bromide

42. What is the correct name for the compound Na₂O?

a. disodium oxide
b. sodium oxide
c. sodium(I) oxide
d. sodium peroxide
e. sodium superoxide

43. Which one of the following is a correct name for the compound FeBr₃?

a. ferrous bromide
b. iron(III) bromide
c. iron bromite
d. iron tribromide  
e. iron tribromine

44. Which one of the following is the correct formula for the compound ferrous sulfate?
   a. FeSO₄  
b. Fe(SO₄)₂  
c. Fe₂SO₄  
d. Fe₂(SO₄)₃  
e. Fe₃(SO₄)₂

45. Which one of the following is a correct name for the compound Hg₂Cl₂?
   a. dimercury dichloride  
b. mercuric chloride  
c. mercury(I) chloride  
d. mercury(II) dichloride  
e. there is no correct name, the formula should be HgCl

46. Which one of the following is a correct formula for mercury(I) phosphate?
   a. HgPO₃  
b. HgPO₄  
c. Hg₃PO₄  
d. Hg₂PO₃  
e. (Hg₂)₃(PO₄)₂

47. Which one of the following is a correct name for the compound CoF₃?
   a. cobalt fluoride  
b. cobalt trifluoride  
c. cobaltic fluoride  
d. cobaltic trifluoride  
e. cobaltous fluoride

48. A correct name for the compound, SnF₄, would be
   a. stannic tetrafluoride  
b. stannous fluoride  
c. stannous(IV) fluoride  
d. tin(IV) fluoride  
e. tin tetrafluoride

49. A correct formula for stannous nitrate would be
   a. Sn(NO₂)₂  
b. Sn(NO₃)₂  
c. Sn(NO₃)₃  
d. Sn(NO₃)₄  
e. Sn₂NO₃
50. What is the correct formula for the compound, magnesic chlorate?

   a. MgClO₃
   b. Mg(ClO₃)₂
   c. Mg₂ClO₃
   d. MgO(ClO₃)₂
   e. there is no such compound

51. What is the correct name for the compound BaSeO₃?

   a. barium selenate
   b. barium selenide
   c. barium selenite
   d. barium selenium trioxide
   e. barium selenoxate

52. What is the correct name for the compound Na₂Cr₂O₇?

   a. sodium chromium(VII)-ate
   b. sodium dichromate
   c. sodium dichromium heptaoxide
   d. sodium heptaoxochromate
   e. sodium perchromate

53. The compound Na₂S₂O₃ is used extensively in photographic film processing. What is its chemical name?

   a. sodium bisulfite
   b. sodium disulfur trioxide
   c. sodium oxosulfate(IV)
   d. sodium thiosulfate
   e. sodium trioxosulfite

54. What is the correct name for the compound Na₂Cr₂O₇?

   a. sodium chromate
   b. disodium chromate
   c. disodium bichromate
   d. sodium dichromate
   e. disodium dichromium heptaoxide

55. If the NtO₄²⁻ ion is called nortonate, what is the correct name for the compound K₂NtO₄?

   a. dipotassium nortonium tetraoxide
   b. dipotassium nortonate
   c. potassium nortonate
   d. potassium(I) nortonate
   e. potassium(II) nortonate
56. What is the correct name for the compound Cu₂SO₃?
   a. copper(I) sulfite
   b. copper(II) sulfite
   c. copper thiosulfate
d. cuprous sulfate
e. dicopper sulfur trioxide

66. The correct formula for the compound formed from strontium ion and chromate ion is
   a. SrCrO₃
   b. SrCrO₄
c. Sr₂CrO₄
d. Sr(CrO₄)₂
e. Sr₂(CrO₄)₃

67. The correct formula for the phosphate ion is
   a. PO₄²⁻
b. PO₄³⁻
c. PO₄⁻
d. P₂O₄⁻
e. P₂O₄₂⁻

68. The correct formula for the carbonate ion is
   a. C₂H₃O₂⁻
b. C₂O₄²⁻
c. CO₂⁻
d. CO₃⁻
e. CO₃²⁻

70. The correct formula for the compound formed from the magnesium ion and the chromate ion is
   a. MgCrO₃
   b. MgCrO₄
c. Mg₂CrO₄
d. Mg(CrO₄)₂
e. Mg₂(CrO₄)₃

71. Which one of the following compounds is correctly described as a hydride?
   a. CoCl₂·6H₂O
   b. HC₂H₃O₂
c. NaOH
d. CaH₂
e. C₆H₁₂O₆

75. The correct name for the compound Al(SO₄)₃ is:
a. there is no compound with that formula–it must be incorrectly written  
b. aluminum sulfate  
c. aluminum trisulfate  
d. aluminum(III) sulfate  
e. aluminum sulfite

76. Which one of the following is the correct name for the compound, V(NO₃)₃?

a. vanadium trinitrate  
b. vanadium nitrite  
c. vanadium(III) nitrite  
d. vanadium nitrate  
e. vanadium(III) nitrate

77. Which one of the following is the correct name for the compound, Ba(NO₃)₂?

a. barium dinitrate  
b. barium dinitrite  
c. barium nitrate  
d. barium(II) nitrite  
e. barium(II) nitrate