

**FINAL EXAM Review Package - Chemistry  
Answer Section****COMPLETION**

1. ratios  
proportions
2. uranium
3. N
4. Phosphorus
5. one, four  
1, 4
6. non-metals, metalloids
7. dull  
little  
low
8. conductor
9. Metalloids
10. period
11. increases
12. helium, neon, argon, krypton, xenon, radon
13. argon, tellurium  
potassium, iodine
14. I
15. empty space
16. Thomson
17. Thomson
18. Dalton's
19. protons, neutrons
20. protons
21. neutrons
22. gain, lose
23. fluorine-19
24. 10, 7  
ten, seven
25. argon
26. outermost
27. crystals  
formula units
28. 1, 1  
one, one
29. polyatomic ion
30. three  
3
31. 3-

32. electrical  
electrostatic
33. multivalent
34. aluminum, sulphate
35.  $\text{NH}_4\text{Br}$
36.  $\text{SnCl}_2$
37. gold(III) oxide
38. is flammable  
burns brightly
39. 1, 17  
alkali metals, halogens
40. Group 2 elements  
alkaline earth metals

**MATCHING**

41. C
42. A
43. E
44. D
45. B
  
46. A
47. B
48. B
49. A
50. B
  
51. E
52. D
53. B
54. F
55. A
56. C
  
57. B
58. D
59. C
60. A
61. D
62. C
  
63. C
64. B
65. D
66. C

- 67. A
- 68. A
- 69. E
- 70. A
- 71. D
- 72. C
- 73. B
- 74. B
- 75. C
- 76. A
- 77. D
- 78. D
- 79. C
- 80. B

## ESSAY

- 81. Metals are good conductors of heat. When your hand touches the cold metal, heat is quickly conducted away from your hand, so the metal feels cold. Plastic and rubber are poor conductors of heat. When you touch the cold plastic or rubber, heat is not conducted away from your hand, so the material does not feel as cold.
- 82. Student answers may vary. By carrying out experiments, scientists discovered new information about atoms. Sometimes, this new information could not be explained by the existing model of the atom, so the model had to be modified, or even rejected.
- 83. Normal Al: 2 electrons in the first shell, 8 electrons in the second shell, 3 electrons in the third shell.

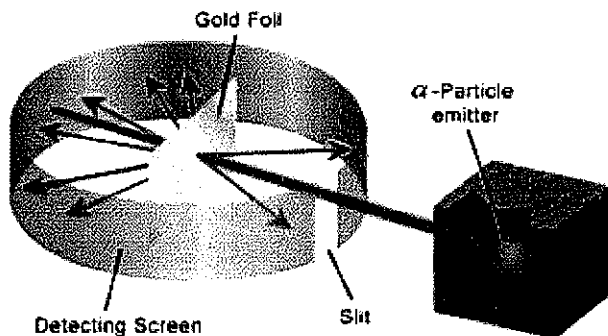
New situation: 1 electron in the first shell, 8 electrons in the second shell, 4 electrons in the third shell.

This situation could occur if one of the first shell electrons gained sufficient energy to move up to the third shell.

The electron which moved up to the third shell (or another one in the third shell) will quickly lose the extra energy and drop back to the first shell.

- 84. Answers will vary. The expected answer uses flame tests to identify the compound. The student should describe a procedure that involves soaking a wood splint in a solution of the compound under investigation for a few hours. When this splint is placed in a Bunsen burner flame for a few seconds, the flame will turn yellow if the compound is sodium carbonate, or pale purple if it is potassium carbonate.
- 85. *Answers will vary.*  
Helium, as a noble gas, is extremely unreactive. Hydrogen, however, is flammable and could cause a fire on the blimp.  
Some students might refer to the Hindenburg explosion.
- 86. (a) I would test the electrical conductivity of the sample. If the sample conducted electricity, I would conclude that it is most likely a metal. If the sample did not conduct electricity, I would conclude that it is a non-metal. (Other answers found in part (b) may be acceptable.)  
(b) Osmium would be shiny, it would conduct heat, it would be malleable, and it would be ductile.

87. Student's diagram should be similar to this.



Student answers may vary. They should mention positive alpha particles travelling towards the gold foil. The particles passed through, and more importantly, some deflected back towards the emitter, suggesting a concentrated, massive positive charge somewhere in the gold atom.

Revisions:

1. Atoms have a nucleus, with most of the mass and a positive charge.
  2. The nucleus contains positive protons.
  3. Most of an atom is empty space.
88. Answers may vary, but the essence of the explanation should be that sodium atoms absorb energy from the electricity, causing electrons to move to a higher shell or energy level. When the electrons return to a lower shell or energy level, they give out energy. The amount of energy given off, which is the difference between the two energy levels, corresponds to yellow light.
89. *Answers will vary.*
- (a) Silicon
  - (b) Phosphorus and arsenic are added to the crystal lattice because they have an extra electron compared to silicon and can thus contribute to conduction.
  - (c) This produces an n-type (negative-type) semiconductor.
  - (d) Boron and gallium are added to the crystal lattice because they have one less electron than silicon, and thus create a place electrons can flow to.
  - (e) This produces a p-type (positive-type) semiconductor.
  - (f) The advantage of sandwiching these two types of semiconductors is that electrons will flow in one direction only, from the n-type (source of electrons) to the p-type (has "holes" for electrons).