Honors Chemistry Ch 5 PRACTICE TEST
Answer Section

MATCHING

1. ANS: A PTS: 1 DIF: L1 REF: p. 130 | p. 131
   OBJ: 5.1.2 STA: Ch.1.e
2. ANS: F PTS: 1 DIF: L1 REF: p. 145
   OBJ: 5.1.3 STA: Ch.1.e
3. ANS: D PTS: 1 DIF: L1 REF: p. 142
   OBJ: 5.1.3 STA: Ch.1.j
4. ANS: B PTS: 1 DIF: L1 REF: p. 133
   OBJ: 5.1.3 | 5.2.1 STA: Ch.1.j
5. ANS: C PTS: 1 DIF: L1 REF: p. 133
   OBJ: 5.2.1 STA: Ch.1.e
6. ANS: E PTS: 1 DIF: L1 REF: p. 134
   OBJ: 5.2.1 STA: Ch.1.e

7. ANS: D PTS: 1 DIF: L1 REF: p. 128
   OBJ: 5.1.3 STA: Ch.1.j
8. ANS: E PTS: 1 DIF: L1 REF: p. 128
   OBJ: 5.1.3 STA: Ch.1.j
9. ANS: B PTS: 1 DIF: L1 REF: p. 138
   OBJ: 5.3.1 STA: Ch.1.j
10. ANS: C PTS: 1 DIF: L1 REF: p. 138
    OBJ: 5.3.1 STA: Ch.1.j
11. ANS: F PTS: 1 DIF: L1 REF: p. 139
    OBJ: 5.3.1 STA: Ch.1.j
12. ANS: A PTS: 1 DIF: L1 REF: p. 141
    OBJ: 5.3.2 STA: Ch.1.j

MULTIPLE CHOICE

13. ANS: A PTS: 1 DIF: L2 REF: p. 128
    OBJ: 5.1.2 STA: Ch.1.i
14. ANS: C PTS: 1 DIF: L2 REF: p. 128
    OBJ: 5.1.2 STA: Ch.1.i
15. ANS: A PTS: 1 DIF: L2 REF: p. 128
    OBJ: 5.1.3 STA: Ch.1.i
16. ANS: C PTS: 1 DIF: L2 REF: p. 131
    OBJ: 5.1.3 STA: Ch.1.i
17. ANS: B PTS: 1 DIF: L2 REF: p. 131
    OBJ: 5.1.3 STA: Ch.1.i
18. ANS: B PTS: 1 DIF: L2 REF: p. 131
    OBJ: 5.1.3 STA: Ch.1.i

19. ANS: D PTS: 1 DIF: L2 REF: p. 131 | p. 132
OBJ: 5.1.3 STA: Ch.1.i
20. ANS: D PTS: 1 DIF: L2 REF: p. 131 | p. 132
OBJ: 5.1.3 STA: Ch.1.i
21. ANS: B PTS: 1 DIF: L2 REF: p. 131 | p. 132
OBJ: 5.1.3 STA: Ch.1.i
22. ANS: B PTS: 1 DIF: L3 REF: p. 132
OBJ: 5.1.3 STA: Ch.1.i
23. ANS: C PTS: 1 DIF: L3 REF: p. 128
OBJ: 5.1.3 STA: Ch.1.i
24. ANS: A PTS: 1 DIF: L2 REF: p. 131
OBJ: 5.1.4 STA: Ch.1.i
25. ANS: B PTS: 1 DIF: L2 REF: p. 131
OBJ: 5.1.4 STA: Ch.1.i
26. ANS: C PTS: 1 DIF: L1 REF: p. 134
OBJ: 5.2.1 STA: Ch.1.i
27. ANS: C PTS: 1 DIF: L2 REF: p. 131
OBJ: 5.2.1 STA: Ch.1.i
28. ANS: D PTS: 1 DIF: L2 REF: p. 133
OBJ: 5.2.1 STA: Ch.1.i
29. ANS: D PTS: 1 DIF: L2 REF: p. 133
OBJ: 5.2.1 STA: Ch.1.i
30. ANS: C PTS: 1 DIF: L2 REF: p. 134 | p. 135
OBJ: 5.2.1 STA: Ch.1.g
31. ANS: D PTS: 1 DIF: L2 REF: p. 133 | p. 134 | p. 135
OBJ: 5.2.1 STA: Ch.1.g
32. ANS: A PTS: 1 DIF: L3 REF: p. 134
OBJ: 5.2.1 STA: Ch.1.g | Ch.1.i
33. ANS: C PTS: 1 DIF: L3 REF: p. 133 | p. 134
OBJ: 5.2.1 STA: Ch.1.g
34. ANS: A PTS: 1 DIF: L3 REF: p. 133 | p. 134
OBJ: 5.2.1 STA: Ch.1.g
35. ANS: A PTS: 1 DIF: L1 REF: p. 136
OBJ: 5.2.2 STA: Ch.1.g
36. ANS: A PTS: 1 DIF: L2 REF: p. 136
OBJ: 5.2.2 STA: Ch.1.i
37. ANS: D PTS: 1 DIF: L2 REF: p. 136
OBJ: 5.2.2 STA: Ch.1.g
38. ANS: A PTS: 1 DIF: L3 REF: p. 133 | p. 134 | p. 135 | p. 136
OBJ: 5.2.2 STA: Ch.1.i
39. ANS: C PTS: 1 DIF: L2 REF: p. 139
OBJ: 5.3.1 STA: Ch.11.e
40. ANS: D PTS: 1 DIF: L2 REF: p. 139
OBJ: 5.3.1 STA: Ch.1.j
41. ANS: D PTS: 1 DIF: L2 REF: p. 139
OBJ: 5.3.1 STA: Ch.1.j

42. ANS: D PTS: 1 DIF: L2 REF: p. 139
OBJ: 5.3.1 STA: Ch.1.j
43. ANS: A PTS: 1 DIF: L2 REF: p. 139
OBJ: 5.3.1 STA: Ch.1.j
44. ANS: C PTS: 1 DIF: L3 REF: p. 140
OBJ: 5.3.1 STA: Ch.1.j
45. ANS: B PTS: 1 DIF: L2 REF: p. 141
OBJ: 5.3.2 STA: Ch.1.j
46. ANS: A PTS: 1 DIF: L2 REF: p. 141
OBJ: 5.3.2 STA: Ch.1.j
47. ANS: A PTS: 1 DIF: L2 REF: p. 142 | p. 143
OBJ: 5.3.2 STA: Ch.1.j
48. ANS: A PTS: 1 DIF: L2 REF: p. 141
OBJ: 5.3.2 | 5.3.3 STA: Ch.1.j
49. ANS: A PTS: 1 DIF: L2 REF: p. 142
OBJ: 5.3.3 STA: Ch.1.j
50. ANS: A PTS: 1 DIF: L2 REF: p. 142
OBJ: 5.3.3 STA: Ch.1.j
51. ANS: A PTS: 1 DIF: L2 REF: p. 143
OBJ: 5.3.3 STA: Ch.1.j
52. ANS: D PTS: 1 DIF: L3 REF: p. 142
OBJ: 5.3.3 STA: Ch.1.j
53. ANS: B PTS: 1 DIF: L3 REF: p. 143
OBJ: 5.3.3 STA: Ch.1.j
54. ANS: D PTS: 1 DIF: L1 REF: p. 144
OBJ: 5.3.4 STA: Ch.1.j
55. ANS: B PTS: 1 DIF: L1 REF: p. 130
OBJ: 5.3.4 STA: Ch.1.i
56. ANS: A PTS: 1 DIF: L2 REF: p. 143
OBJ: 5.1.1 | 5.3.3 | 5.3.4 STA: Ch.1.i
57. ANS: C PTS: 1 DIF: L2 REF: p. 145
OBJ: 5.3.4 STA: Ch.1.i
58. ANS: D PTS: 1 DIF: L2 REF: p. 144
OBJ: 5.3.4 STA: Ch.1.i
59. ANS: D PTS: 1 DIF: L2 REF: p. 145
OBJ: 5.3.4 STA: Ch.1.i
60. ANS: A PTS: 1 DIF: L2 REF: p. 145
OBJ: 5.3.4 STA: Ch.1.i
61. ANS: C PTS: 1 DIF: L2 REF: p. 144
OBJ: 5.3.4 STA: Ch.1.j
62. ANS: B PTS: 1 DIF: L3 REF: p. 131
OBJ: 5.1.4 | 5.3.4 STA: Ch.1.i

SHORT ANSWER

63. ANS:
$1s^2 2s^2$

PTS: 1 DIF: L1 REF: p. 133 | p. 134
OBJ: 5.2.1 STA: Ch.1.g

64. ANS:
$1s^2 2s^2 2p^6 3s^2 3p^5$

PTS: 1 DIF: L2 REF: p. 133 | p. 134
OBJ: 5.2.1 STA: Ch.1.g

65. ANS:
$1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^4$

PTS: 1 DIF: L2 REF: p. 133 | p. 134
OBJ: 5.2.1 STA: Ch.1.g

66. ANS:
$1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$

PTS: 1 DIF: L3 REF: p. 134 | p. 135 | p. 136
OBJ: 5.2.2 STA: Ch.1.g

67. ANS:
$$\nu = c/\lambda = \frac{3.0 \times 10^8 \text{ m/s}}{2.94 \times 10^{-8} \text{ m}} = 1.02 \times 10^{16} \text{ s}^{-1}$$
$$1.02 \times 10^{16} \text{ s}^{-1} \times \frac{1 \text{ Hz}}{\text{s}^{-1}} = 1.02 \times 10^{16} \text{ Hz}$$

PTS: 1 DIF: L2 REF: p. 139 | p. 140
OBJ: 5.3.1 STA: Ch.1.j

68. ANS:
$$\lambda = \text{c}/\nu = \frac{3.00 \times 10^8 \text{ m/s}}{2.73 \times 10^{20} \text{ s}^{-1}} = 1.10 \times 10^{-12} \text{ m}$$

PTS: 1 DIF: L2 REF: p. 139 | p. 140
OBJ: 5.3.1 STA: Ch.1.j

69. ANS:
$\nu = \text{E}/h$
$$\nu = \frac{6.80 \times 10^{-25} \text{ J}}{6.6 \times 10^{-34} \text{ J} \cdot \text{s}}$$
$= 1.03 \times 10^9 \text{ s}^{-1}$
$= 1.03 \times 10^9 \text{ Hz}$

PTS: 1 DIF: L2 REF: p. 142 OBJ: 5.3.3
STA: Ch.1.j

70. ANS:
$E = h \times \nu$
$= (6.63 \times 10^{-34}\ J{\cdot}s) \times (1.12 \times 10^{12}\ s^{-1})$
$= 7.43 \times 10^{-22}\ J$

PTS: 1 DIF: L2 REF: p. 142 OBJ: 5.3.3
STA: Ch.1.j

NUMERIC RESPONSE

71. ANS: 7

PTS: 1 DIF: L3 REF: p. 131 OBJ: 5.1.3 | 5.2.1
STA: Ch.1.j | Ch.1.g

72. ANS: 2

PTS: 1 DIF: L3 REF: p. 134 | p. 135 | p. 136
OBJ: 5.2.1 STA: Ch.1.j | Ch.1.g

73. ANS: 1

PTS: 1 DIF: L2 REF: p. 136 OBJ: 5.2.2
STA: Ch.1.j | Ch.1.g

ESSAY

74. ANS:
An *s* orbital has the shape of a sphere and is the orbital having the lowest energy. A *p* orbital is dumbbell-shaped and has the next higher energy. A *d* orbital has a more complex shape and a higher energy than either an *s* orbital or a *p* orbital. An *f* orbital has the highest energy of these four orbital types; this orbital has a very complex shape.

PTS: 1 DIF: L2 REF: p. 131 | p. 132
OBJ: 5.1.4 STA: Ch.1.i

75. ANS:
Electrons occupy orbitals in a definite sequence, filling orbitals with lower energies first. Generally, orbitals in a lower energy level have lower energies than those in a higher energy level. But, in the third level the energy ranges of the principal energy levels begin to overlap. As a result, the 4*s* sublevel is lower in energy than the 3*d* sublevel, so it fills first.

PTS: 1 DIF: L2 REF: p. 133 OBJ: 5.2.1
STA: Ch.1.i

76. ANS:
The aufbau principle states that electrons enter the orbitals of lowest energy first. The Pauli exclusion principle states that each orbital can hold only two electrons. Hund's rule states that electrons first enter separate orbitals of the same energy, with each electron having the same spin, before pairing with electrons that have opposite spins.

PTS: 1 DIF: L3 REF: p. 133 | p. 134 | p. 135 | p. 136
OBJ: 5.2.1 | 5.2.2 STA: Ch.1.i

77. ANS:
Atoms absorb energy, causing electrons to be raised from one orbital to an orbital of higher energy. When these excited electrons fall back to lower energy levels, they emit light. The lines result from the fact that the electrons can move only between discrete energy levels. Emissions of specific frequencies of light correspond to these energy changes.

PTS: 1 DIF: L3 REF: p. 141 OBJ: 5.3.2 | 5.3.3
STA: Ch.1.j

78. ANS:

The mass of an object must be very small in order to observe its wavelength. Classical mechanics describes the motions of objects much larger than atoms. The motion of objects with sizes in the atomic range and smaller are best described (and are detectable) as waves.

PTS: 1 DIF: L2 REF: p. 145 OBJ: 5.3.4

79. ANS:
It is a model that describes subatomic particles and atoms as waves. Schrodinger applied a mathematical model of the wave/particle nature of matter to hydrogen. Solutions to the Schrodinger equation determine the energies an electron can have and how likely it is to find the electron in various locations.

PTS: 1 DIF: L3 REF: p. 130 | p. 145
OBJ: 5.1.3 | 5.3.4 STA: Ch.1.i

80. ANS:
The measurement of the speed or position of a moving particle necessarily involves an interaction with the particle. Therefore, the position or the speed of the particle is changed as a result of the measurement. As a consequence, accurate measurements of both these variables cannot be made at the same time.

PTS: 1 DIF: L3 REF: p. 145 OBJ: 5.3.4
STA: Ch.1.i