1. Nickel has 28 protons in its nucleus.
2. The electron configuration of Ru ends in 4d^9.
3. Oxygen has 6 valence electrons.
4. The fourth energy level can hold 32 electrons.
5. Studying cathode rays, J.J. Thomson found the electron.
6. The fourth energy level has 4 sublevels.
7. Draw the electron dot structure for lead. \( \text{Pb} \).
8. A barium ion has a charge of +2.
9. The fifth period halogen is iodine.
10. Write the noble gas configuration for tungsten (W). \[ \text{[Kr]} 5s^2 4f^{14} 5d^2 \]
12. ^{109}\text{Ag} has 62 neutrons in its nucleus.
13. The iodide ion has a charge of -1.
14. Is the potassium ion an anion or a cation?
15. The nucleus was found by Rutherford.
16. The fourth period alkaline earth metal is calcium.
17. There are 22 electrons in a titanium atom.
18. There are 18 electrons in a calcium ion.
19. A cathode ray is a stream of electrons.
20. In an atom of gold, there are 10 4d electrons.

1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^10 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^9

21. An f-orbital can hold up to 2 e-.
22. An atom of sulfur has 2 unpaired e-.
23. Rubidium has two naturally occurring isotopes, ^{85}\text{Rb} and ^{87}\text{Rb}. Which isotope is in greater abundance? Explain. Atomic mass = \( 85.47 \)
24. Silver also has two naturally occurring isotopes. 51.35% is silver with a mass of 106.950 amu and the remaining 48.65% is silver with a mass of 108.949 amu. Calculate the average atomic mass of silver. 54.92 + 53.00 = 107.92 amu
25. The nitride ion has a charge of -3.
26. A p-sublevel has 3 orbitals.
27. The e- configuration of Ge ends in 4p^2.
28. Write the e- configuration for cobalt. \( 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7 \)
29. Name the third period element with 3 unpaired electrons. Phosphorus
30. Mercury has 2 valence e-.
31. Draw a p-orbital. \( \text{O} \).
32. Draw the e- dot structure for antimony. \( \text{Sb} \).
33. An atom of vanadium (V) has 3 unpaired e-. (3d^5)
34. Write the e- configuration for a sulfur atom. \( 1s^2 2s^2 2p^6 3s^2 3p^4 \)
35. Write the e- configuration for a sulfide ion. \( 1s^2 2s^2 2p^6 3s^2 3p^6 \)
36. Draw a 2s orbital. Draw a 3s orbital.

37. An ion of barium-140 has 56 p\(^+\), 84 n\(^0\), and 54 e\(^-\).
38. ID the 4\(^{th}\) period elements with 2 unpaired e-. Ti, Ni, Ge, Se.
39. Write the noble gas configuration for Er. \[ \text{[Xe]-54\text{e}^\text{n}} \text{] 6s^2 5d^4 4f^7 \]
40. An atom of Er has 4 unpaired e-.
41. The f-sublevel can hold up to 14 e-.
42. The oxide ion has a charge of -2.

43. Draw a p-sublevel.
44. Identify the sixth period transition metals with 4 unpaired e-. W, Os.
45. Identify four ions that are isoelectronic with xenon. \( \text{I}^-, \text{Te}^{2-}, \text{Cs}^+, \text{Ba}^{2+} \)
46. Write the noble gas configuration for iron. \[ \text{[Ar]-18} \text{] 4s^2 3d^6 \]
47. Write the noble gas configuration for Fe\(^{2+}\). \[ \text{[Ar]-18} \text{] 4s^0 3d^6 \]
48. Describe what happens to the e- when an atom is put in a flame. Why do we see colors? Why do we see different colors?

49. Is a compound between oxygen and chlorine ionic or covalent? Explain your reasoning.

50. The correct formula for an ionic compound between sodium and oxygen is \( \text{Na}_2\text{O} \).

51. The Greek word “atomos” means uncuttable.

52. The fourth energy level has 16 orbitals.

53. Tin’s configuration ends in \( 5p^2 \).

54. Draw the electron dot structure for In. \( :\text{In} \).

55. Antimony has 5 valence electrons.

56. Platinum has 78 protons.

57. A cathode ray is attracted to a positive plate.

58. Rutherford shot \( \alpha \) particles at gold foil and found the nucleus.

59. The periodic law states that the properties of the elements are periodic functions of their atomic masses was developed by Mendeleev.

60. Mendeleev predicted the existence and the properties of elements that had not yet been discovered. His predictions proved to be very accurate.

61. What is the likely formula for a compound between hydrogen and sulfur? Explain your reasoning. \( \text{H}_2\text{S} \).

62. State the five postulates of Dalton’s atomic theory. Which postulate(s) is/are no longer true?

63. The e- configuration of Ir ends in \( 5d^7 \).

64. Mendeleev arranged the elements in order of increasing mass. Today’s periodic table arranges the elements in order of increasing atomic number.