

- 15) What is the total number of electrons in an Mg^{+2} ion?
 a) 10 b) 24 c) 2 d) 12
- 16) Which of the following electron configurations represents an atom in the excited state?
 a) 2-8 b) 2-8-1 c) 2-6-1 d) 2-1
- 17) Which principal energy level of an atom contains an electron with the lowest energy?
 a) 3 b) 4 c) 1 d) 2
- 18) The atomic mass of an element is defined as the weighted average mass of that element's
 a) naturally occurring isotopes c) radioactive isotopes
 b) least abundant isotope d) most abundant isotope
- 19) Compared to the entire atom, the nucleus of the atom is
 a) smaller and contains most of the atom's mass c) larger and contains most of the atom's mass
 b) smaller and contains little of the atom's mass d) larger and contains little of the atom's mass
- 20) What is the nuclear charge in an atom of boron?
 a) +11 b) +6 c) +5 d) +12
- 21) What subatomic particle was discovered in the cathode ray tube experiment?
 a) proton b) electron c) neutron d) gravitron

Short Answer

22) In 1909, a team of British scientists led by Ernest Rutherford, carried out the Gold Foil Experiment to determine the arrangement of particles in the atom. In this experiment, alpha particles were used to bombard gold foil.

- a) Most of the alpha particles passed through the gold foil undeflected. What conclusion was made about the structure of the atom based on this observation? **(1 pt.)**
- b) A few of the alpha particles were deflected back at the source and toward the screen. What did this observation reveal about the structure of the atom? **(1 pt.)**

23) An element has two isotopes. 90% of the isotopes have a mass number of 20 amu, while 10% have a mass number of 22 amu. Calculate the atomic mass of the element. Show all work with units. **(3 pts.)**

24) Complete the chart below: (9 pts.)

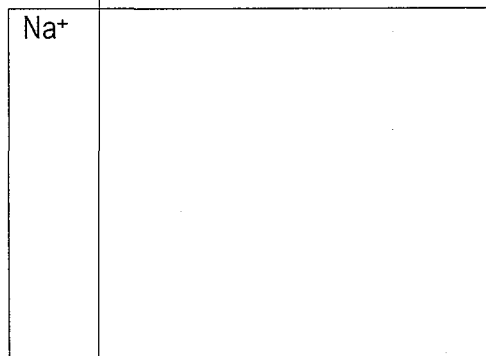
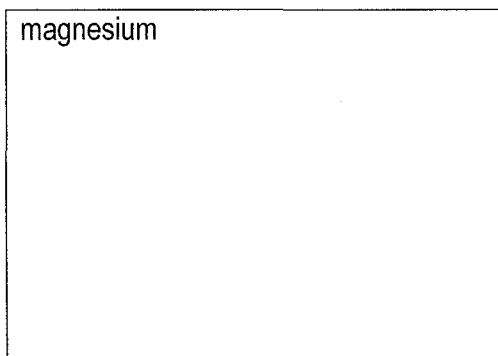
Substance	Atom or Ion?	# protons	# neutrons	# electrons	Atomic #	Mass number
Mg ⁺²						
Rb						
Cl ⁻						

25) What is the electron configuration for a neutral sulfur atom? (1 pt.)

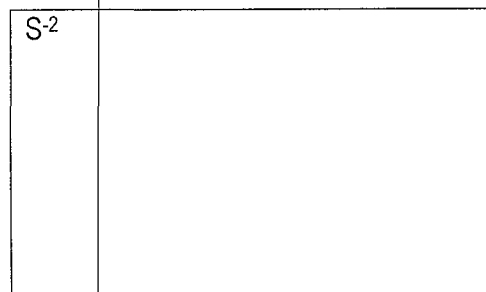
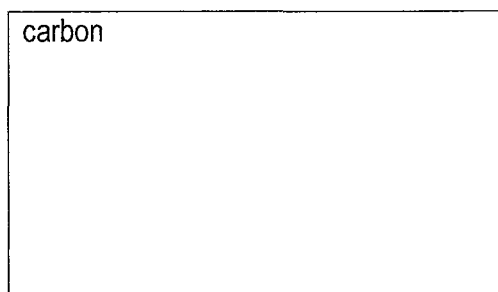
26) What is the electron configuration for S²⁻? (1 pt.)

27) Based on the two given substances in question 25 and 26, how can you tell the difference between an atom and an ion? (2 pts.)

28) Draw **Bohr Diagrams** for the following substances (1 pt. each):



29) Draw **Lewis Dot Diagrams** for the following substances (1 pt. each):



30) What is the total number of valence electrons in an atom of Mg-26 in the ground state? **(1 pt.)**

31) What is the total number of kernel electrons in an atom of Mg-26 in the ground state? **(1 pt.)**

32) Write a possible electron configuration that could represent magnesium in the excited state. **(1 pt.)**