

- What is the overall charge of an ion that has 12 protons, 10 electrons, and 14 neutrons?
A) 2- **B) 2+** C) 4- D) 4+
- Which particles have approximately the same mass?
A) an electron and an alpha particle
B) an electron and a proton
C) a neutron and an alpha particle
D) a neutron and a proton
- Which phrase describes an atom?
A) a negatively charged nucleus surrounded by positively charged protons
B) a negatively charged nucleus surrounded by positively charged electrons
C) a positively charged nucleus surrounded by negatively charged protons
D) a positively charged nucleus surrounded by negatively charged electrons
- What is the number of electrons in an atom that has 3 protons and 4 neutrons?
A) 1 B) 7 **C) 3** D) 4
- An ion that consists of 7 protons, 6 neutrons, and 10 electrons has a net charge of
A) 4- **B) 3-** C) 3+ D) 4+
- As a result of the gold foil experiment, it was concluded that an atom
A) contains protons, neutrons, and electrons
B) contains a small, dense nucleus
C) has positrons and orbitals
D) is a hard, indivisible sphere
- The gold foil experiment led to the conclusion that each atom in the foil was composed mostly of empty space because most alpha particles directed at the foil
A) passed through the foil
B) remained trapped in the foil
C) were deflected by the nuclei in gold atoms
D) were deflected by the electrons in gold atoms
- What is the charge of the nucleus of an oxygen atom?
A) 0 B) -2 **C) +8** D) +16

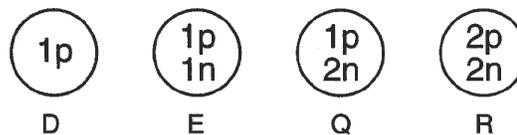
- A sample of matter must be copper if
A) each atom in the sample has 29 protons
B) atoms in the sample react with oxygen
C) the sample melts at 1768 K
D) the sample can conduct electricity
- What can be determined if only the atomic number of an atom is known?
A) the total number of neutrons in the atom, only
B) the total number of protons in the atom, only
C) the total number of protons and the total number of neutrons in the atom
D) the total number of protons and the total number of electrons in the atom
- What is the mass number of a carbon atom that contains six protons, eight neutrons, and six electrons?
A) 6 B) 8 **C) 14** D) 20
- An atom that has 13 protons and 15 neutrons is an isotope of the element
A) nickel B) silicon
C) aluminum D) phosphorus
- The total number of protons, electrons, and neutrons in each of four different atoms are shown in the table below.

Subatomic Particles in Four Different Atoms

| Atom | Total Number of Protons | Total Number of Electrons | Total Number of Neutrons |
|------|-------------------------|---------------------------|--------------------------|
| A | 6 | 6 | 7 |
| D | 6 | 6 | 8 |
| X | 7 | 7 | 8 |
| Z | 8 | 8 | 9 |

Which two atoms are isotopes of the same element?

- A) **A and D** B) A and Z
C) X and D D) X and Z
- Each diagram below represents the nucleus of a different atom.



Which diagrams represent nuclei of the same element?

- A) D and E, only **B) D, E, and Q**
C) Q and R, only D) Q, R, and E

15. The atomic masses and the natural abundances of the two naturally occurring isotopes of lithium are shown in the table below.

Lithium Isotopes

| Isotope | Atomic Mass (u) | Natural Abundance (%) |
|---------|-----------------|-----------------------|
| Li-6 | 6.02 | 7.5 |
| Li-7 | 7.02 | 92.5 |

Which numerical setup can be used to determine the atomic mass of lithium?

- A) $(0.075)(6.02 \text{ u}) + (0.925)(7.02 \text{ u})$
 B) $(0.925)(6.02 \text{ u}) + (0.075)(7.02 \text{ u})$
 C) $(7.5)(6.02 \text{ u}) + (92.5)(7.02 \text{ u})$
 D) $(92.5)(6.02 \text{ u}) + (7.5)(7.02 \text{ u})$
16. The atomic mass of titanium is 47.88 atomic mass units. This atomic mass represents the

- A) total mass of all the protons and neutrons in an atom of Ti
 B) total mass of all the protons, neutrons, and electrons in an atom of Ti
 C) weighted average mass of the most abundant isotope of Ti
 D) **weighted average mass of all the naturally occurring isotopes of Ti**

17. What is the total number of valence electrons in an atom of germanium in the ground state?

- A) 8 B) 2 C) 14 **D) 4**

18. Which statement describes the relative energy of the electrons in the shells of a calcium atom?

- A) An electron in the first shell has more energy than an electron in the second shell.
 B) An electron in the first shell has the same amount of energy as an electron in the second shell.
 C) **An electron in the third shell has more energy than an electron in the second shell.**
 D) An electron in the third shell has less energy than an electron in the second shell.

19. Which electron configuration represents the electrons of an atom in an excited state?

- A) 2-1 **B) 2-7-4** C) 2-8-7 D) 2-4

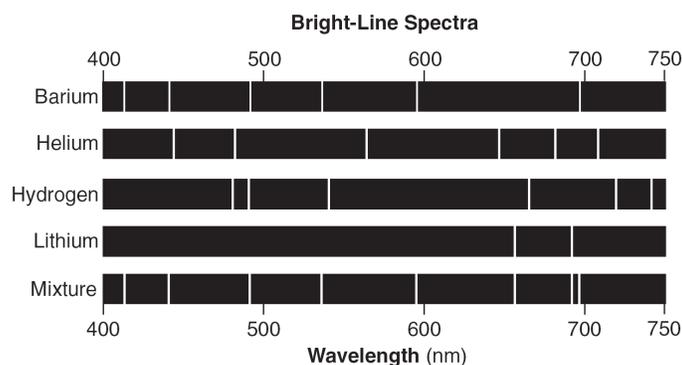
20. Which statement describes how an atom in the ground state becomes excited?

- A) **The atom absorbs energy, and one or more electrons move to a higher electron shell.**
 B) The atom absorbs energy, and one or more electrons move to a lower electron shell.
 C) The atom releases energy, and one or more electrons move to a higher electron shell.
 D) The atom releases energy, and one or more electrons move to a lower electron shell.

21. During a flame test, a lithium salt produces a characteristic red flame. This red color is produced when electrons in excited lithium atoms

- A) are lost by the atoms
 B) are gained by the atoms
 C) **return to lower energy states within the atoms**
 D) move to higher energy states within the atoms

22. The diagram below represents the bright-line spectra of four elements and a bright-line spectrum produced by a mixture of two of these elements.



Which two elements are in this mixture?

- A) barium and hydrogen
 B) **barium and lithium**
 C) helium and hydrogen
 D) helium and lithium

23. Which electron configuration represents an atom in an excited state?

- A) 2-7 **B) 2-6-2**
 C) 2-8-1 D) 2-8-8-2

24. The most common isotope of chromium has a mass number of 52. Which notation represents a different isotope of chromium?

- A) $^{52}_{24}\text{Cr}$ **B) $^{54}_{24}\text{Cr}$**
 C) $^{24}_{52}\text{Cr}$ D) $^{24}_{54}\text{Cr}$

25. Every chlorine atom has

- A) 7 electrons
- B) 17 neutrons
- C) a mass number of 35
- D) an atomic number of 17**

Answer Key
unit 3 exam part 1

1. **B**
 2. **D**
 3. **D**
 4. **C**
 5. **B**
 6. **B**
 7. **A**
 8. **C**
 9. **A**
 10. **D**
 11. **C**
 12. **C**
 13. **A**
 14. **B**
 15. **A**
 16. **D**
 17. **D**
 18. **C**
 19. **B**
 20. **A**
 21. **C**
 22. **B**
 23. **B**
 24. **B**
 25. **D**
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