
SAMPLE REGENTS & REGENT-TYPE QUESTIONS AND SOLUTIONS

1. A neutron has approximately the same mass as
 (1) an alpha particle (3) an electron
 (2) a beta particle (4) a proton

2. What is the total number electrons present in an atom of ${}^{56}_{27}\text{Co}$?
 (1) 27 (2) 32 (3) 59 (4) 86

3. A particle of matter contains 6 protons, 7 neutrons and 6 electrons. This particle must be a
 (1) neutral carbon atom (3) positively charged carbon ion
 (2) neutral nitrogen atom (4) positively charged nitrogen ion

4. What is the mass number of an atom which contains 28 protons, 28 electrons and 34 neutrons?
 (1) 26 (2) 56 (3) 62 (4) 90

5. Neutral atoms of ${}^{35}\text{Cl}$ and ${}^{37}\text{Cl}$ differ with respect to their number of
 (1) electrons (2) protons (3) neutrons (4) positrons

6. One atomic mass unit equals
 (1) $1/12$ the mass of ${}^{12}_6\text{C}$ (2) $1/12$ the mass of ${}^1_1\text{H}$
 (3) $1/7$ the mass of ${}^{14}_7\text{N}$ (4) $1/8$ the mass of ${}^{16}_8\text{O}$

7. An element has an atomic number of 18. What is the principal quantum number (n) of its outermost electrons?
 (1) 1 (2) 2 (3) 3 (4) 4

8. Which is the electron dot symbol of an atom of boron in the ground state?
 (1) $\cdot\ddot{\text{B}}\cdot$ (2) $\text{B}\cdot$ (3) $\cdot\text{B}\cdot$ (4) $\ddot{\text{B}}$

SOLUTIONS

1. Answer 4. You can get a higher mark on the Regents by just knowing how to use the Tables. Look at Table O, on page Reference Tables 17. On Table O, it is written neutron ${}^1_0\text{n}$ and proton ${}^1_1\text{H}$. You know the top number is the mass number and you see that the neutron and proton have the same mass.

2. Answer 1. You learned that the atomic number is equal to the number of protons, which is equal to the number of electrons. The question is what is the number of electrons in ${}^{56}_{27}\text{Co}$. The bottom number is the atomic number. ${}_{27}\text{Co}$ means the atomic number is $27 = 27$ protons = 27 electrons.

3. Answer 1. 6 protons means atomic number 6. 6 protons (positive) = 6 electrons (negative), which means a neutral atom. Look at the Periodic Table. Atomic number 6 is a carbon atom. The answer is Answer 1, a neutral carbon atom.

4. Answer 3. Mass number is equal to the total number of protons and neutrons: $28 + 34 = 62$.

5. Answer 3. Atoms of the same element have the same atomic number. On the Periodic Table, you see chlorine (Cl) has an atomic number of 17. $^{35}_{17}\text{Cl}$ and $^{37}_{17}\text{Cl}$ are isotopes. They have the same atomic number, but different mass numbers and differ in the number of neutrons. Remember, you learned that the number of neutrons = mass number - atomic number.

$$\text{In } ^{35}_{17}\text{Cl, number of neutrons} = 35 - 17 = 18.$$

$$\text{In } ^{37}_{17}\text{Cl, number of neutrons} = 37 - 17 = 20.$$

6. Answer 1. One atomic mass unit is defined as 1/12 the mass of $^{12}_6\text{C}$.

7. Answer 3. Look at the Periodic Table. Look at atomic number 18. Look at the electron configuration of atomic number 18, $_{18}\text{Ar}$: 2-8-8. You see that the outermost electrons are in the third shell, or third principal energy level.

8. Answer 4. Electron dot notation shows electrons in the last shell. Look at the electron configuration of boron, $^{11}_5\text{B}$, on the Periodic Table:

Electron configuration: 2 - 3

In the second (last) shell, there are 3 electrons. Next to the letter B, show three dots, which represent the 3 electrons in the last shell, B•••.