# SAMPLE QUESTIONS AND SOLUTIONS

1. Which substance can not be decomposed into simpler substances?
   (1) ammonia   (2) aluminum   (3)methane   (4) methanol

2. Which statement describes a characteristic of all compounds?
   (1) Compounds contain one element, only.
   (2) Compounds contain two elements, only.
   (3) Compounds can be decomposed by chemical means.
   (4) Compounds can be decomposed by physical means.

3. Which formula represents a binary compound?
   (1) NH_4NO_3 (2) CH_4 (3) CH_3COCH_3 (4) $CaCO_3$

4. An example of a heterogeneous mixture is:
   (1) soil   (3) carbon monoxide
   (2) sugar   (4) carbon dioxide

5. What occurs when the temperature of 10.0 grams of water is changed from 15.5°C to 14.5°C?
   (1) The water absorbs 103.5 joules.
   (2) The water releases 41.8 joules.
   (3) The water absorbs 26.9 joules.
   (4) The water releases 62.7 joules.

6. How many joules are equivalent to 35 kilojoules?
   (1) 0.035 joule   (3) 3,500 joules
   (2) 0.35 joule   (4) 35,000 joules

7. The diagrams below represent two solids and the temperature of each.
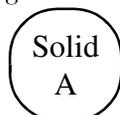
   Solid
   A

   Temperature
   50°C
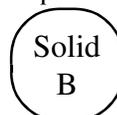
   Solid
   B

   Temperature
   80°C

   What occurs when the two solids are placed in contact with each other?
   (1) Heat energy flows from solid *A* to solid *B*. Solid *A* decreases in temperature.
   (2) Heat energy flows from solid *A* to solid *B*. Solid *A* increases in temperature.
   (3) Heat energy flows from solid *B* to solid *A*. Solid *B* decreases in temperature.
   (4) Heat energy flows from solid *B* to solid *A*. Solid *B* increases in temperature.

8. The amount of energy needed to change a given mass of ice to water at constant temperature is called the heat of
   (1) condensation   (3) fusion
   (2) crystallization   (4) formation

SOLUTIONS

1. Answer *2*. You learned that **elements** cannot be decomposed into anything simpler. Aluminum is an element. Aluminum (Al) is on the Periodic Table of Elements.

2. Answer *3*. Remember, this is the definition of a compound.

3. Answer *2*. A binary compound consists of *only* two elements. Answer 2, CH_4, is made up of *only* two elements, *C* and *H*. The other choices are wrong because they have more than two elements. Each element starts with a capital letter.

4. Answer *1*. You learned that a mixture has two or more substances mixed together. Soil has minerals, rocks, dirt, bacteria, etc., all mixed together. Soil is heterogeneous because different parts of the soil have different amounts of materials. Some parts of the soil have more rocks; some parts of the soil have less rocks.

5. Answer *2*. Remember the formula: # joules = grams x C× ΔT. To find ΔT, subtract the two temperatures. 15.5°C - 14.5°C = 1°C ; # joules = grams x C × ΔT, # joules = 10 x 4.18 × 1 = 41.8. When the temperature of the water gets lower, 15.5°C to 14.5°C, it means water gives off (releases) joules (heat).

6. Answer *4*. 1 kilojoule = 1,000 joules. Therefore, 35 kilojoules = 35,000 joules.

7. Answer *3*. Remember, you learned that heat flows from a higher temperature to a lower temperature until both are at the same temperature. Heat flows from solid B (80°C) to solid A (50°C) until both are at the same temperature (about 65°C). Solid B's temperature decreases.

8. Answer *3*. Heat of Fusion is the amount of heat needed to change a solid to a liquid at constant temperature.

SAMPLE 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 of electrons present in an atom of $_{27}^{56}Co$?
   (3) 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
   (4) neutral carbon atom   (3) positively charged carbon ion
   (5) neutral nitrogen atom   (4) positively charge nitrogen ion

4. What is the mass number of an atom which contains 28 protons, 28 electrons and 34 neutrons?
   (6) 26   (2) 56   (3) 62   (4) 90

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

6. A particle has a mass of 1.0 atomic mass unit. What is the approximate mass of this particle in grams?
   (8) 1.0 g   (2) 2.0 g   (3) 1.7×10^{-24} g   (4) 6.0×10^{-23} g

SOLUTIONS

1. Answer *4*. You can get a higher mark on the Regents by just knowing how to use the Tables. Look at Table J, on page Reference Tables-10. On Table J, it is written neutron $_{0}^{1}n$ and proton $_{1}^{1}H$. 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 $_{27}^{56}Co$. The bottom number is the atomic number. $_{27}Co$ 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.
   $_{17}^{35}Cl$ and $_{17}^{37}Cl$ 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.
   In $_{17}^{35}Cl$, number of neutrons = 35 - 17 = 18.
   In $_{17}^{37}Cl$, number of neutrons = 37 - 17 = 20.

6. Answer *3*. Look at Reference Table A. There, it is written that an atomic mass unit is 1.6×10^{-24} g. "g" means grams. Answer 3, 1.7×10^{-24}, is close to 1.66×10^{-24}. You can get a higher mark by just knowing how to use the Reference Tables.