

Reading SAT Practice Test 28

This passage is adapted from Charles Anderson, "Conflict Minerals from the Democratic Republic of the Congo – Tin Processing Plants, a Critical Part of the Tin Supply Chain" © 2015 by U.S. Geological Survey

Tin is a metal often found in nature in its oxidized form, as the mineral called cassiterite. Cassiterite has been the primary source of tin throughout history, and remains the primary source of tin today. Small amounts of tin are also recovered from sulphide minerals such as stannite. Cassiterite is found in alluvial deposits and can also be found in lode deposits in association with other metallic minerals.

10 Cassiterite is mined by the dredging of alluvial deposits, where the ore is broken up by either high-pressure water or an excavator, or hard-rock mining methods, usually from underground mines. Crushed ore is concentrated, usually

15 in co-location with the mine, through a combination of flotation, gravity, and magnetic processes to produce a cassiterite concentrate containing 70–77 percent tin. Tin concentrate is then smelted by heating it in the presence of

20 carbon to 1,200–1,300 degrees Celsius, reducing
the cassiterite to tin metal, and releasing carbon
dioxide. Following the smelting process to
produce tin metal, the remaining impurities are
removed through a refining process, usually at a
25 facility co-located with the smelter. Refining tin
involves heating it to temperatures just past the
tin melting point, allowing impurities to drop out
as solids, and then skimming off the pure liquid
tin. Refining is done by either heat treatment
30 or electrolytic processes. Heat treatment uses
carbon-based fuel as a main heat source, usually
in a reverberatory furnace. Heat treatment is
more widely used than electrolytic processes,
but produces only 99.85 percent tin. Electrolytic
35 processing involves inserting the smelted tin in an
ionic solution and running an electrical current
through it. The smelted tin is the anode, and the
cathode collects the pure tin metal. Electrolytic
processing is more expensive, but provides up to
40 99.9999 percent tin.

Tin is often found in everyday life. It is the primary component of solder. Solder is used to combine two pieces of metal, allowing an electrical charge to flow across the connection.

45 Solder is used on every electronic circuit board, and it is difficult or expensive to replace. There are some substitutes available for tin, with lead being the most viable alternative. Solder has been made from lead and tin, but since the Safe

50 Drinking Water Act, tin has become the primary metal in solder. Tin is also a primary component in food grade tin cans manufactured from tinplate. Tinplate is made by annealing molten tin onto a steel sheet. The resulting metal, formed

55 into cans, is then used in canning food, where the tin prevents corrosion and leaching of steel into the food product. Tinplate accounts for about 25 percent of domestic tin consumption. Because tin is not harmful to humans, it is a preferred

60 method of canning and preserving food for long-term storage. Substitutes for tinplate include aluminum, plastic, and organic-coated steel. Tin is also used in chemicals and accounts for 35 percent of domestic consumption.

65 The tin supply chain is complex and, often,
opaque. Companies usually report products that
they supply to the market place; however, they
may not describe which of their plants use which
starting materials or processes. As a result, plants
70 reported for some multi-plant corporations may
or may not consume or produce all of the tin
materials reported. Some large companies have
multiple plants, which may or may not have been
described in sufficient detail to identify their
75 location or the tin material that was processed.
For example, information was not available on all
tin producing companies, and many companies
that were reported to have been tin suppliers
could not be confirmed as such. Companies
80 changed names, were referred to imprecisely,
changed ownership, or went out of business.

1. Based on the passage, the author would most likely consider tin to be

- A. expensive.
- B. practical.
- C. complicated.
- D. synthetic.

2. Which choice provides the best evidence for the answer to the previous question?

- A. Lines 14-18 ("Crushed...tin")
- B. Lines 38-40 ("Electrolytic...tin")
- C. Lines 58-61 ("Because tin...storage")

D. Lines 65-66 ("The tin...opaque")

3. The overall structure of the passage could best be described as

- A. a complete analysis of a naturally occurring element.
- B. an overview of the steps and results of a process.
- C. an introduction written for a geology course.
- D. an explanation of the solution to a problem.

4. The most likely application of tin produced by means of electrolytic processing would be

- A. plating for commonly produced canned goods, to be widely distributed.
- B. miniature figurines designed to be painted and displayed.
- C. small amounts of material intended for scientific analysis.
- D. solder sold worldwide as part of a campaign to market lead-free products.

5. Between the first and second paragraphs, the focus shifts from

- A. meticulous attention to detail to broad, assumptive generalizations.
- B. scientific analysis of the properties and uses of a material to industrial processes.
- C. detailed description of a series of steps to implementation of a result.
- D. overview of a specific cycle to its role in the mining industry.

6. What can most reasonably be inferred about the Safe Water Drinking Act from the passage?

- A. It specified the nature and percentage of the components of solder.
- B. It may have impacted what elements a company chose to use in making solder.
- C. It promoted tin over lead for all applications.
- D. It prompted shifts in the manufacture and distribution of canned goods.

7. The author indicates that the demand for tin in part exists because

- A. tin can be found in nature.
- B. tin of nearly 100% purity can be produced.
- C. tin is the best conductor of electricity.
- D. of tin's impact on an individual's health.

8. Which choice provides the best evidence for the answer to the previous question?

- A. Lines 1-2 ("Tin is...cassiterite")
- B. Lines 38-40 ("Electrolytic...tin")
- C. Lines 42-44 ("Solder...connection")
- D. Lines 58-61 ("Because tin...storage")

9. As used in line 66, "opaque" most nearly means

- A. dark.
- B. wide.
- C. impenetrable
- D. dense.

10. The sentence in lines 79-81 ("Companies changed...business") primarily serves to

- A. indicate a continuation of an existing chain.
- B. describe the many uses for a product.
- C. show the sole difficulty in answering a question.
- D. support an earlier statement