

## Table A Standard Temperature And Pressure

1 Which set of values represents standard pressure and standard temperature?

- |                       |                         |
|-----------------------|-------------------------|
| (1) 1 atm and 101.3 K | (3) 101.3 kPa and 0°C   |
| (2) 1 kPa and 273 K   | (4) 101.3 atm and 273°C |

Based on the atomic mass of the element nitrogen on the Periodic Table, compare the relative abundances of the naturally occurring isotopes of nitrogen. [1] Base your answers to questions 2 on the information below and on your knowledge of chemistry.

The melting points and boiling points of five substances at standard pressure are listed on the table below.

**Melting Points and Boiling Points of Five Substances**

Substance	Melting Point (K)	Boiling Point (K)
HCl	159	188
NO	109	121
F <sub>2</sub>	53	85
Br <sub>2</sub>	266	332
I <sub>2</sub>	387	457

2 Identify the substance in this table that is a liquid at STP.

Base your answers to questions 3 on the information below and on your knowledge of chemistry.

The enclosed cabin of a submarine has a volume of  $2.4 \times 10^5$  liters, a temperature of 312 K, and a pressure of 116 kPa. As people in the cabin breathe, carbon dioxide gas, CO<sub>2</sub>(g), can build up to unsafe levels. Air in the cabin becomes unsafe to breathe when the mass of CO<sub>2</sub>(g) in this cabin exceeds 2156 grams.

3 Convert the original air pressure in the cabin of the submarine to atmospheres.

### Answer Keys

1 3

2 Allow 1 credit for Br<sub>2</sub> or bromine.

3 Allow 1 credit for 1.15 atm or any value from 1.14 atm to 1.16 atm, inclusive.