

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 ₂ | 53 | 85 |
| Br ₂ | 266 | 332 |
| I ₂ | 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 2.4×10^5 liters, a temperature of 312 K, and a pressure of 116 kPa. As people in the cabin breathe, carbon dioxide gas, CO₂(g), can build up to unsafe levels. Air in the cabin becomes unsafe to breathe when the mass of CO₂(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 Br₂ or bromine.

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