



- 9) If a reaction with a negative value of  $\Delta S$  is nonspontaneous at constant temperature and pressure,
- $\Delta G$  is negative and  $\Delta H$  may be positive or negative.
  - $\Delta G$  is negative and  $\Delta H$  is positive.
  - $\Delta G$  is positive and  $\Delta H$  may be positive or negative.
  - $\Delta G$  is positive and  $\Delta H$  is positive.
- 10) Methanol can be produced from carbon monoxide and hydrogen with suitable catalysts:  
 $\text{CO}(g) + 2 \text{H}_2(g) \rightarrow \text{CH}_3\text{OH}(l)$  at  $25^\circ\text{C}$   $\Delta H^\circ = -128.1 \text{ kJ}$  and  $\Delta S^\circ = -332 \text{ J/K}$   
 Find  $\Delta G^\circ$  at  $25^\circ\text{C}$ .
- 157.2 kJ
  - 29.1 kJ
  - 98.9 kJ
  - 157.2 kJ
- 11) Consider the conversion of white tin to gray tin:  
 $\text{Sn}(\text{white}) \rightarrow \text{Sn}(\text{gray})$   $\Delta H^\circ = -2.09 \text{ kJ}$   $\Delta S^\circ = -7.41 \text{ J/K}$   
 Based on these data,
- white tin is stable below  $9^\circ\text{C}$  and gray tin is stable above  $9^\circ\text{C}$ .
  - gray tin is stable below  $9^\circ\text{C}$  and white tin is stable above  $9^\circ\text{C}$ .
  - white tin is stable below  $15^\circ\text{C}$  and gray tin is stable above  $15^\circ\text{C}$ .
  - gray tin is stable below  $15^\circ\text{C}$  and white tin is stable above  $15^\circ\text{C}$ .
- 12) Carbon dioxide is a gas which causes environmental concern because of the greenhouse effect. What is the approximate percentage (by volume) of  $\text{CO}_2$  in the atmosphere?
- less than 0.1%
  - about 1%
  - about 10%
  - more than 20%
- 13) Which of the following equations represents "Boyle's law"?
- $\frac{P}{V} = k$
  - $\frac{V}{T} = k$
  - $PV = k$
  - $V = nk$
- 14) Which law does the equation,  $\frac{V}{n} = k$  represent?
- Avogadro's law
  - Boyle's law
  - Charles' law
  - Graham's law
- 15) An "empty" aerosol can at  $25^\circ\text{C}$  still contains gas at 1.00 atmosphere pressure. If an "empty" can is thrown into a  $475^\circ\text{C}$  fire, what is the final pressure in the heated can?
- $5.26 \times 10^{-2} \text{ atm}$
  - 0.398 atm
  - 2.51 atm
  - 19.0 atm
- 16) A 75.0 L steel tank at  $20.0^\circ\text{C}$  contains acetylene gas,  $\text{C}_2\text{H}_2$ , at a pressure of 1.39 atm. Assuming ideal behavior, how many grams of acetylene are in the tank?
- 4.33 g
  - 6.01 g
  - 113 g
  - 1650 g
- 17) Three identical flasks contain three different gases at standard temperature and pressure. Flask A contains  $\text{CH}_4$ , flask B contains  $\text{CO}_2$ , flask C contains  $\text{N}_2$ . Which flask contains the largest number of molecules?
- flask A
  - flask B
  - flask C
  - All flasks contain the same number of molecules.

- 18) A gas bottle contains 0.650 mol of gas at 730 mm Hg pressure. If the final pressure is 1.15 atm, how many moles of gas were added to the bottle?
- A) 0.0680 mol                      B) 0.128 mol                      C) 0.717 mol                      D) 0.778 mol
- 19) A balloon filled with helium gas at 20°C occupies 2.91 L at 1.00 atm. The balloon is immersed in liquid nitrogen at -196°C, raising the pressure to 5.20 atm. What is the volume of the balloon in the liquid nitrogen?
- A) 0.15 L                              B) 2.1 L                              C) 4.0 L                              D) 58 L
- 20) The volume of 350. mL of gas at 25°C is decreased to 125 mL at constant pressure. What is the final temperature of the gas?
- A) -167°C                              B) 8.9°C                              C) 70°C                              D) 561°C

Answer Key

Testname: 1100ENTROPYGASLAW

- 1) B
- 2) C
- 3) D
- 4) C
- 5) C
- 6) C
- 7) B
- 8) B
- 9) C
- 10) B
- 11) B
- 12) A
- 13) C
- 14) A
- 15) C
- 16) C
- 17) D
- 18) B
- 19) A
- 20) A