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CALVIN

1) Particles are far apart in a gas.

2) Temp, Pressure, amount of gas

3) AIRBAG contains gas which can be compressed

4) T↓ P↓ (G-L's law)

5) Increase volume 4 times

6) Add 100 times more gas

7) $V_1 = 2.50L$
$P_1 = 105\ kPa$
$P_2 = 40.5\ kPa$
$V_2 = ?$

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad V_2 = \frac{P_1V_1}{P_2} = \frac{(105\ kPa)(2.50L)}{(40.5\ kPa)} = \boxed{6.48\ L}$

8) $V_1 = 4.00L$
$P_1 = 205\ kPa$
$V_2 = 12.0L$
$P_2 = ?$

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad P_2 = \frac{P_1V_1}{V_2} = \frac{(205\ kPa)(4.00L)}{(12.0L)} = \boxed{68.3\ kPa}$

9) $V_1 = 6.80L$
$T_1 = 325°C \rightarrow 598K$
$T_2 = 25°C \rightarrow 298K$
$V_2 = ?$

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad V_2 = \frac{V_1T_2}{T_1} = \frac{(6.80L)(298K)}{(598K)} = \boxed{3.39\ L}$

10) $V_1 = 5.00L$
$T_1 = -50.0°C \rightarrow 223K$
$T_2 = 100.0°C \rightarrow 373K$
$V_2 = ?$

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\quad V_2 = \frac{V_1T_2}{T_1} = \frac{(5.00L)(373K)}{(223K)} = \boxed{8.36\ L}$

11) $P_1 = 6.58\ kPa$

$T_1 = 539\ K$

$T_2 = 211\ K$

$P_2 = ?$

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$P_2 = \frac{P_1 T_2}{T_1} = \frac{(6.58\ kPa)(211\ K)}{(539\ K)} = \boxed{2.58\ kPa}$$

12) $P_1 = 198\ kPa$

$T_1 = 27°C \rightarrow 300K$

$P_2 = 225\ kPa$

$T_2 = ?$

$$T_2 = \frac{P_2 T_1}{P_1} = \frac{(225\ kPa)(300\ K)}{(198\ kPa)} = \boxed{341\ K}$$

13) $P_1 = 155\ kPa$

$T_1 = 25°C \rightarrow 298K$

$V_1 = 1.00\ L$

$P_2 = 605\ kPa$

$T_2 = 125°C \rightarrow 398K$

$V_2 = ?$

$$V_2 = \frac{P_1 V_1 T_2}{T_1 P_2} = \frac{(155\ kPa)(1.00\ L)(398\ K)}{(298\ K)(605\ kPa)} = \boxed{0.342\ L}$$

14) $V_1 = 5.00\ L$

$P_1 = 107\ kPa$

$T_1 = -50.0°C \rightarrow 223K$

$T_2 = 102°C \rightarrow 375K$

$V_2 = 7.00\ L$

$P_2 = ?$

$$P_2 = \frac{P_1 V_1 T_2}{T_1 V_2} = \frac{(107\ kPa)(5.00\ L)(375\ K)}{(223\ K)(7.00\ L)} = \boxed{129\ kPa}$$