Part 1 Boyles Law ($P_1V_1 = P_2V_2$)

1. P_1 0.82 atm P_2 1.00 atm
   V_1 3.5 L V_2

$0.82\text{atm}(3.5\text{L}) = 1.00\text{atm} \cdot V_2$

$\frac{2.87}{1.00} = \frac{1.00\ V_2}{1.00}$

$V_2 = 2.87\text{ L}$

2. P_1 760 mmHg P_2 ?
   V_1 23.7 mL V_2 28.0 mL

$760 \times 23.2 = P_2 \cdot 28.0$

$\frac{17632}{28.0}$ 629.7 mmHg

3. P_1 1.00 atm P_2 0.89 atm
   V_1 13.0 L V_2 ?

$\frac{13.0}{0.89} = 0.89 \cdot V_2$

$14.6\text{ L} = V_2$

Part 2 Charles Law ($\frac{V_1}{T_1} = \frac{V_2}{T_2}$)

4. V_1 5.5 L V_2
   T_1 25+273 (298) T_2 10.0+273 (283)

$\frac{5.5}{298} = \frac{V_2}{283}$ 5.22 L

5. V_1 125 V_2 175
   T_1 101+273 (374) T_2

$\frac{125}{374} = \frac{175}{T_2}$ 523.6 K

6. V_1 13.0 mL V_2 ?
   T_1 298 T_2 453

$\frac{13}{298} = \frac{V_2}{453}$ 19.8 mL

Part 3: Guy Lussacs Law ($\frac{P_1}{T_1} = \frac{P_2}{T_2}$)

7. P_1 85.0 kPa P_2 101.3 kPa
   T_1 298 T_2

$\frac{85}{298} = \frac{101.3}{T_2}$ 355 K

8. P_1 30.0 atm P_2
   T_1 274.5 T_2 318

$\frac{30.0}{274.5} = \frac{P_2}{318}$ V_2 = 34.8 atm

9. P_1 25.6 P_2 0.98
   T_1 298 T_2

$\frac{25.6}{298} = \frac{0.98}{T_2}$ 11.4 K

Part 4 MIXED GAS PROBLEMS (LUSAC)

GIVEN: (GUY LUSSACS)

P, 1.20atm P_2 9.92atm

T_1 295 T_2 ?

$\frac{1.2}{295} = \frac{9.92}{?}$ 2440K

GIVEN: (BOYLE'S LAW)

P, 2.50atm P_2 1.00atm

T_1 T_2

V_1 0.050L V_2 ?

$2.50 \times 0.050 = 1.00 \times V_2$

0.125L

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12. GUY LUSSACS

P, 1.00atm P_2 2.0×10^6

T, 296.5 T_2 ?

$\frac{1.00}{296.5} = \frac{2.0 \times 10^6}{T_2}$

5.93×10^8 K

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13. BOYLE'S LAW

P, 3.04×10^4 mmHg P_2 150.0mmHg

T_1 T_2

V, 10.0L V_2

$3.04 \times 10^4 \times 10.0 = 150.0 \times V_2$

2026 L

Part 5. Combined Gas Law $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{V_2}$

14. P, 1.2atm P_2 1.4

V, 23L V_2 ?

T_1 205 T_2 325

$\frac{1.2 \cdot 23}{205} = \frac{1.4 \cdot V_2}{325}$

$1.2 \cdot 23 \cdot 325 = 1.4 \cdot 205 \cdot V_2$

$\frac{8970}{287} = \frac{287V_2}{287}$

31.25L, VOLUME INCREASED

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5. P, 2.0atm P_2 ?

V, 28.0L V_2 27.0L

T_1 298.5 T_2 318

$\frac{2.0 \times 28.0}{298.5}$ $\frac{P_2 \times 27.0L}{318}$

$2.0 \times 28 \times 318 = P_2 \times 27.0 \times 298.5$

$17808 = 8059.5P_2$

radiator fires!!

16. P_1 81.0 kPa P_2 64 kPa
V_1 17 L V_2
T_1 294 K T_2 353

$\frac{81 \times 17}{294} = \frac{64 \times V_2}{353}$

$4860.81 = 188.16 V_2$

25.8 L

Part 6: more Gas Law Prob.

7. P_1 0.50 P_2 1 2 atm
V_1 ? V_2 48 L
T_1 325 T_2 320 K

$\frac{0.50 \cdot V_1}{325} = \frac{1.2 \cdot 48}{320}$

$\frac{18.720}{160} = \frac{160 V_1}{160}$

117 L

COMBINED

18. P_1 4 x 10^6 P_2 1.00 atm
V_1 0.50 L V_2 ?
T_1 T_2

4.0×10^6 atm · 0.50 L = 1.00 atm V_2

2.0×10^6 L

Boyles

9. P_1 760 mmHg P_2 ?
V_1 2.0000 L V_2
T_1 293 T_2 328

$\frac{760}{293} = \frac{P}{328}$

850 mm Hg

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20. P_1 P_2
V_1 2.2 L V_2 ?
T_1 291 T_2 311

$\frac{2.2 L}{291} = \frac{V_2}{311}$

2.35 L

Charles

21. P_1 1.00 atm P_2
V_1 9.5 L V_2 0.700 L
T_1 273 T_2 258

$\frac{1.00 \cdot 9.5}{273} = \frac{P_2 \cdot 0.700}{258}$

138 atm

COMBINED

22. P_1 1.00 P_2 6.00 x 104
V_1 2.00 L V_2 ?
T_1 T_2

$\frac{1 \cdot 2}{} = \frac{6.00 \times 104}{V_2}$

30.000 L

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23. P_1 3.000 atm P_2 4.000 atm
V_1 V_2
T_1 298 T_2 ?

$\frac{3}{298} = \frac{4}{P}$

397 K

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24. P_1 P_2
V_1 2.0 L V_2 ?
T_1 298 T_2 269

$\frac{2.0}{298} = \frac{V_2}{269}$

1.80 L

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25. P_1 1
V_1 250 mL V_2 ?
T_1 292 T_2 333

$\frac{250}{292} = \frac{V_2}{333}$

295 mL