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39. The space between the particles decreases

40. Adding heat means increasing the kinetic energy of the particles. Since they have increased speed, they increase the number of collisions with the container walls which increases the pressure (Force/area)

◎ 41. The volume decreases because the low temp. slows molecule motion and causes them to have less space between the particles

42. moles + pressure are directly proportional so if moles double, pressure doubles

43. Volume & pressure are inversely proportional. So if volume drops by $\frac{4}{1}$ then pressure increases by $\frac{4}{1}$

44. (particle) Moles are leaving, thereby decreasing the # of collisions on the container

45. $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ volume one (initial) divided by ~~temp~~ temp one (initial) is equivalent to volume 2 divided by temp 2

46. $P_1 = 3.00 \times 10^2$ kPa
$T_1 = 303$ K
$T_2 = 101$ K
$P_2 = ?$

$\frac{P_1}{T_1} = \frac{P_2}{T_2}$ $\frac{300}{303} = \frac{P_2}{101}$ $\frac{P_2 303}{303} = \frac{(300)(101)}{303}$

$P_2 = 100$ kPa

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$P_1V_1 = P_2V_2$

47. $V_1 = ?\ L$
$P_1 = 100\ kPa$
$V_2 = 1500\ mL$
$P_2 = 120\ kPa$

$\frac{100 V_1}{100} = \frac{(1500mL)(120kPa)}{100}$

$V_1 = 1800mL$ — 1.8L

48. $V_1 = 4.0L$
$P_1 = 90\ kPa$
$P_2 = 20\ kPa$
$V_2 = ?$

$\frac{(90)(4)}{20} = \frac{20\ V_2}{20}$

$V_2 = 18L$

49. $V_1 = 300mL$
$T_1 = 150 + 273 = 423K$
$V_2 = 600\ mL$
$T_2 = ?$

$\frac{V_1}{T_1} = \frac{V_2}{T_2}$ $\frac{300}{423} = \frac{600}{T_2}$

$\frac{300T_2}{300} = \frac{(600)(423)}{300}$

$T_2 = 846K$

50. $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

51. $P_1 = 1000\ KPa$
$T_1 = 20 + 273 = 293K$
$T_2 = 50 + 273 = 323K$
$P_2 = ?$

$\frac{1000}{293} = \frac{P_2}{323}$

$\frac{P_2(293)}{293} = \frac{(1000)(323)}{293}$

$P_2 = 1102\ kPa$

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

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53. no volume, no intermolecular forces under high temp and low press.

54. gases do have volume and IMFs and they change phases under low temp and high pressures

55. $V = ?$
$n = 1.24\ mol$
$T = 35°C + 273 = 308K$
$P = 96.2\ kPa$

$PV = nRT$

$$\frac{(96.2\ kPa)(V)}{96.2\ kPa} = \frac{(1.24\ mol)(8.31\ \frac{kPa \cdot L}{K\ mol})(308K)}{96.2\ kPa}$$

$V = 32.9L$

56. $V = ?$
$n = 12.0\ g\ O_2 \times \frac{1\ mol\ O_2}{32\ g\ O_2} = 0.375\ mol$

$PV = nRT$

$T = 25°C + 273 = 298K$
$P = 52.7\ kPa$

$$\frac{(52.7\ kPa)V}{52.7\ kPa} = \frac{(.375\ mol)(8.31\ \frac{kPa \cdot L}{K\ mol})(298K)}{52.7\ kPa}$$

$V = 17.6L$

57. $n = 4.5\ g\ CH_4 \times \frac{1\ mol\ CH_4}{16\ g\ CH_4} = 0.281\ mol$
$V = 2.0L$
$T = 35°C + 273 = 308K$
$P = ?$

$$\frac{P(2.0)}{2.0} = \frac{(0.281)(8.31)(308)}{2.0}$$

$P = 359.6\ kPa$

58. $V = 240L$
$P = 99\ kPa$
$T = 273K$
$n = ?$ grams

$$\frac{(99)(240)}{(8.31)(273)} = \frac{n(8.31)(273)}{(8.31)(273)}$$

$n = 10.5\ mol\ He \times \frac{4.0\ g\ He}{1\ mol\ He} = 42g\ He$