Algebra in chemistry

Education in Chemistry
April 2020
rsc.li/2VvRtaZ

Complete the following questions, showing your working at each step.

Q1 $\quad \frac{x}{y} = z$

(i) Make *y* the subject; (ii) make *z* the subject.

Q2 $\quad a = \frac{b}{c}$

(i) Make *b* the subject; (ii) make *c* the subject.

Q3 $\quad Moles = \frac{Mass}{Gram\ Formula\ Mass}$

(i) Make *Gram Formula Mass* the subject; (ii) make *Mass* the subject.

Q4 $\quad Concentration = \frac{Moles}{Volume}$

(i) Make *Volume* the subject; (ii) make *Moles* the subject.

Q5 $\quad \Delta G = \Delta H - T\Delta S$

(i) Make ΔH the subject; (ii) make T the subject; (iii) make ΔS the subject.

Q6 $\quad 4a = 12b - 16$

For the next step, perform an operation to obtain a single '*a*' term from the '*4a*' term.

Q7 $\quad 4y + 2z = 10a - 4x$

For the next step, perform an operation to obtain a single '2*y*' from the '4*y*' term.

Q8 $\quad \Delta G = \Delta H - T\Delta S$

For the next step, perform an operation to obtain a '$-\Delta S'$ term from the '$-T\Delta S'$ term.

Q9 The combined gas law is given by,

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

Make each of the following the subject: (i) P_1; (ii) V_1; (iii) T_1; (iv) P_2; (v) V_2; (vi) T_2; (vii) $P_1 V_1$; (viii) $P_2 V_2$; (ix) $P_1 T_2$; (x) $P_2 T_1$; (xi) $\frac{P_1}{T_1}$; (xii) $\frac{P_2}{T_2}$; (xiii) $\frac{V_1}{T_1}$; (xiv) $\frac{V_2}{T_2}$; (xv).

How many other permutations can you find?

Q10 For the reaction $H_2 + I_2 \rightleftharpoons 2HI$, the equilibrium expression is:

$$K_c = \frac{[HI]^2}{[H_2][I_2]}$$

(i) Make $[H_2]$ the subject; (ii) make $[I_2]$ the subject; (iii) make $[HI]$ the subject.