Chapter 3 Homework Answers

3-3. *(a)* 0.217 (b) 0.216 (c) 0.217

3-5. (a) 3.71 (b) 10.7 (c) 4.0 x 101 (d) 2.85 x 10^{-6} (e) 12.625 1 (f) 6.0 x 10^{-4} (g) 242

3-6. (a) $BaC1_2$ = 137.327 + *2(35.452 7)* = 208.232

3-9 See Section 3-4

3-12. (a) Carmen (b) Cynthia (c) Chastity (d) Cheryl

3-14. (a) 6.2 (±0.2)

- 4.1 (±0.1)

2.1 ± e $e^2 = 0.2^2 + 0.1^2 \Rightarrow e = 0.2_2$ Answer: 2.1 ± 0.2 (or 2.1 ± 11%)

(b) 9.43 (±0.05) 9.43 (±0.53%)

× 0.016 (±0.001) ⇒ × 0.016 (±6.25%) $\%e^2 = 0.53^2 + 6.25^2$

0.150 88 (± $\%e$) ⇒ $\%e$ = 6.272

Relative uncertainty = 6.27%; Absolute uncertainty = 0.150 88 × 0.062 7 = 0.009 46; Answer: 0.151 ± 0.009 (or 0.151 ± 6%)

(c) The first term in brackets is the same as part (a), so we can rewrite the problem as 2.1 ($\pm 0.2_{24}$) ÷ 9.43 (±0.05) = 2.1 (±10.7%) ÷ 9.43 (±0.53%)

$\%e = \sqrt{10.7^2 + 0.53^2}$ = 10.7%

Absolute uncertainty = 0.107 × 0.223 = 0.023 9

Answer: $0.22_3 \pm 0.02_4$ (±11%)

(d) The term in brackets is

6.2 (±0.2) × 10^{-3} $e = \sqrt{0.2^2 + 0.1^2} \Rightarrow e = 0.2_{24}$

+ 4.1 (±0.1) × 10^{-3}

10.3 ($\pm 0.2_{24}$) × 10^{-3} = 10.3 × 10^{-3} (±2.17%)

9.43 (±0.53%) × 0.010 3 (±2.17%) = 0.097 13 ±2.26% = 0.097 13 ±0.002 20

Answer: $0.097_1 \pm 0.002_3$ (± 2.3%)