

**Chemistry**  
**Standard level**  
**Paper 1A**

Practice paper

**Topic: Measurement and Uncertainty (SL)**

1. Which identifies a systematic error?
  - A. Using an uncalibrated thermometer
  - B. Variation in lab room temperature
  - C. Random bubbles in a titrating reagent
  - D. Human reaction time during a stop-watch measurement
  
2. A high coefficient of determination ( $R^2$  close to 1) primarily indicates:
  - A. High accuracy relative to literature
  - B. High precision and low random error
  - C. No systematic error in the procedure
  - D. Ideal chemical behavior of the reactants
  
3. Calibration calculation:  $(10.00 \pm 0.05) + (5.00 \pm 0.05)$ . Absolute uncertainty?
  - A.  $\pm 0.05$
  - B.  $\pm 0.10$
  - C.  $\pm 0.00$
  - D.  $\pm 1\%$
  
4. Number of sig figs in 0.002050?
  - A. 3
  - B. 4
  - C. 5
  - D. 6
  
5.  $(2.0 \pm 0.1) * (5.0 \pm 0.2)$ . What is the percentage uncertainty?
  - A. 5%
  - B. 4%
  - C. 9%
  - D. 0.3%
  
6. Which error lowers  $R^2$ ?
  - A. Consistent crucible mass offset
  - B. Unbalanced scale zero error
  - C. Fluctuating water temperature during calorimetry points
  - D. Miscalculating a final molar mass
  
7. Correlation coefficient R versus  $R^2$ :
  - A. R is the square of  $R^2$
  - B.  $R^2$  describes the fraction of variance explained
  - C. R measures the y-intercept offset

D. R is only for non-linear models

8. Correct axis label for an enthalpy plot?

- A.  $\Delta H / \text{kJ mol}^{-1}$
- B. Enthalpy kJ/mol
- C. mol/kJ
- D.  $\Delta H \text{ mol}^{-1}$

9. Which property is limited by random error?

- A. Accuracy
- B. Precision
- C. Bias
- D. Calibrated yield

10.  $R^2 = 0.90$  suggests:

- A. 90% accuracy
- B. 90% of variance is explained by the trendline
- C. 10% systematic error
- D. Systematic offsets are non-existent