
HL Paper 1

Which technique is used to determine the bond lengths and bond angles of a molecule?

- A. X-ray crystallography
 - B. Infrared (IR) spectroscopy
 - C. Mass spectroscopy
 - D. ^1H NMR spectroscopy
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A student heated a solid in a crucible. The student measured the mass of the solid and crucible before and after heating and recorded the results.

Mass of crucible and solid before heating	= 101.692 g
Mass of crucible and solid after heating	= 89.312 g

What value should the student record for the mass lost in grams?

- A. 12.4
 - B. 12.38
 - C. 12.380
 - D. 12.3800
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The molar mass of a gas, determined experimentally, is 32 g mol^{-1} . Its literature molar mass is 40 g mol^{-1} .

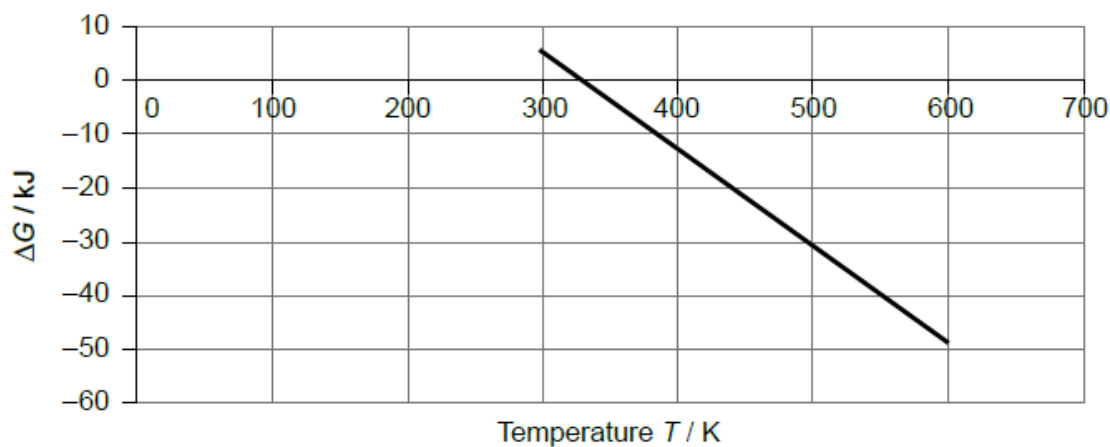
What is the percentage error?

- A. 80%
 - B. 25%
 - C. 20%
 - D. 8%
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A measuring cylinder was used to obtain a known volume of a liquid. The volume was read from the top of the meniscus and the liquid completely emptied into a flask. The exact same process was then repeated. Which statement is correct about the overall described procedure and the volumes measured?

- A. There is a systematic error and the volumes measured are accurate.
 - B. There is a random error and the volumes measured are accurate.
 - C. There is a random error and the volumes measured are inaccurate.
 - D. There is a systematic error and the volumes measured are inaccurate.
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The graph shows values of ΔG for a reaction at different temperatures.



Which statement is correct?

- A. The standard entropy change of the reaction is negative.
- B. The standard enthalpy change of the reaction is positive.
- C. At higher temperatures, the reaction becomes less spontaneous.
- D. The standard enthalpy change of the reaction is negative.

A student measured the mass and volume of a piece of silver and recorded the following values.

Mass of empty weighing bottle	1.0800 g
Mass of weighing bottle with piece of silver	11.5700 g
Volume of silver	1.00 cm ³

Which value, in g cm^{-3} , for the density of silver should the student report in her laboratory notebook?

- A. 10.49
- B. 10.4900
- C. 10.5
- D. 10.500