Topic 1.2 – Uncertainties and errors – Pt2 **Formative Assessment**

NAME: _____

*THIS IS A PRACTICE ASSESSMENT. Show formulas, substitutions, answers (in spaces provided) and units!*

*A table of data was created by a student during an experiment in which a paper helicopter was dropped from various heights.*

| Height $H$ / m $\Delta H = \pm 0.1$ m | Fall Time $T_i$ / s $\Delta T_i = \pm 0.2$ s | | | Average Fall Time $T$ / s $\Delta T_i$ = _____ |
|---|---|---|---|---|
| | Trial 1 | Trial 2 | Trial 3 | |
| 1.0 | 1.4 | 1.7 | 1.6 | |
| 1.5 | 2.0 | 2.2 | 1.8 | |
| 2.0 | 2.4 | 2.7 | 2.7 | |
| 2.5 | 3.1 | 3.7 | 3.4 | |
| 3.0 | 3.9 | 3.8 | 4.2 | |

11. Complete the last column of the table.

12. Does it appear that the student has done the right number of trials and variations to satisfy the internal assessment requirements of the IBO? Be sure to explain very clearly your reasoning. 12. _____

13. Create a graph which plots *Average Fall Time vs. Height*. Be sure to label the graph properly. 13. ____See graph____

14. On the same graph sketch the vertical error bars on each point. 14. ____See graph____

15. On the same graph sketch in your line of best fit. 15. ____See graph____

16. Calculate the slope of the line of best fit. Be sure to include the units. 16. _____

17. From your graph, determine the intercept. Include its units. 17. _____

18. On the same graph sketch in the maximum and minimum slopes, using the first and last error bars as your guide. 18. ____See graph____

19. Calculate the minimum and maximum slopes. Be sure to include the units. 19. _____
_____

20. Calculate the uncertainty of the slope. 20. _____

21. What are the intercepts of the lines representing the minimum and maximum slopes? 21. _____
_____

22. Calculate the uncertainty of the intercept. 22. _____

23. State, in words, the slope (and uncertainty) of your graph and its physical meaning.

24. State, in words, the intercept (and uncertainty) of your graph and its physical meaning.