QUIZEN – Unit and measurement (11P01)

Learning Level 1	***Learning Level 2***	***Learning Level 3***
Q - Remembering (knowledge-based questions) U - Understanding (comprehension-based questions)	I - Applying (application-based questions) Z - Analyzing (analysis-based questions)	*E - Evaluating (evaluation-based questions)* *N - Creating (creation-based questions)*

Learning Level 1

1. Define significant figures.
2. How are significant figures determined in a measured value?
3. State the rules for rounding off numbers using significant figures.
4. What is the purpose of using significant figures in scientific calculations?
5. Explain the concept of absolute error and relative error in measurement.

Learning Level 2

6. The mass of an object is measured as 25.67 g on a balance. Determine the number of significant figures in the measurement.
7. A rectangular field has a length of 12.5 m and a width of 8.76 m. Calculate its area and express the result using the appropriate number of significant figures.
8. The speed of sound in air is measured as 345 m/s. If the actual value is 343 m/s, calculate the percentage error in the measurement.
9. A student measures the time period of a pendulum to be 2.50 seconds. Determine the absolute error and the relative error in the measurement if the actual value is 2.45 seconds.

10. The density of a substance is calculated by dividing the mass by the volume. If the mass is measured as 15.6 g with a relative error of 2% and the volume is measured as 8.2 cm^3 with a relative error of 3%, determine the relative error in the density calculation.

Learning Level 3

11. Discuss the importance of using significant figures and error analysis in scientific experiments. Provide examples to support your answer.
12. A laboratory technician measures the mass of a sample three times and obtains the values 5.62 g, 5.63 g, and 5.61 g. Evaluate the precision and accuracy of the measurements.
13. A scientist conducts an experiment to determine the acceleration due to gravity. The measured value is 9.78 m/s^2, while the accepted value is 9.81 m/s^2. Analyze the scientist's result and determine the percentage error.
14. Design an experiment to measure the density of an irregularly shaped object using the principles of significant figures and error analysis. Provide a step-by-step procedure and explain how you would calculate the density with the appropriate number of significant figures.
15. Reflect on the challenges and limitations of significant figures and error analysis in scientific measurements. Discuss any potential sources of error and suggest ways to minimize or account for them.