

Nondestructive Evaluation Pre/Post-Quiz **Answer Key**

Instructions: Answer the following questions to the best of your ability using 1 to 3 complete sentences each.

1. What is nondestructive testing and why is it important?

Example answers:

Nondestructive testing methods are ways to test for weaknesses, such as cracks in materials that make up parts, without taking them apart or causing damage to them, and ways to find defects that are not visible with human eyes.

Nondestructive evaluation methods investigate what happens when energy is introduced into materials as a way to locate flaws that cannot be seen that could lead to failures and potential catastrophes.

Nondestructive testing enables us to examine the physical structures and objects in our lives to make sure they are safe, reliable and long-lived.

2. Why are systems of equations used to help model (finite element method) in manufacturing?

Example answer:

Systems of equations are used to solve complex physics equations to model experiments virtually.

3. Where can you see the use of nondestructive testing and mathematical modeling (finite element method) applied in the real world?

Example answers:

Nondestructive evaluation (NDE) methods are tools that help to prevent the real-world structural failure of planes, buildings, bridges and other physical structures and objects by providing a way of testing them without damaging them in the process.

Finite element analysis enables detailed visualization of structures, where they bend or twist, indicating areas of stress and defect.

In our complex, modern world of human-engineered structures, vehicles and products that we depend upon, this nondestructive testing is important because failures can impact so many lives.

Many different types of NED technologies have been invented and are used in a wide variety of engineering fields as well as medicine and art—for the analysis of bridges, dams, airplanes, vehicles, tunnels, mechanical parts and the human body.