Teacher Answer Key

Case Study

1. Radiocarbon dating works on parchment because it is made from animal skin, an organic material that contains carbon-14. Since the carbon-14 stopped being replenished when the animal died, measuring the remaining carbon-14 reveals when the animal lived, which exposes modern forgeries.

2. Radiocarbon dating measures when the organic material died, not when ink was applied to it. A forger could use old parchment with new ink, so additional tests like ink composition analysis or examination of writing style would be needed to fully evaluate the manuscript.

Multiple Choice

1. B

2. A

3. C

Matching

1-D, 2-C, 3-E, 4-B, 5-A

Fill-in-the-Blank

1) Nobel, 2) 5730, 3) 1390

Short Answer (Sample Responses)

Q1: A half-life is the time it takes for half of the radioactive atoms in a sample to decay. After about 50,000 years, so little carbon-14 remains that instruments cannot measure it accurately, making the method unreliable for older materials.

Q2: The date is not necessarily wrong because radiocarbon dating measures when the tree died, not when the wood was used in the building. The church may have been built with recycled timber from an older structure, meaning the wood is older than the church.

Q3: AMS allowed dating of tiny samples like individual seeds, revealing when crops were first cultivated. It also made it possible to date precious artifacts like the Shroud of Turin using postage-stamp-sized samples that would not significantly damage the original object.