

Study Guide — BI Problem 7: Forensic Autopsy (Pretest)

Biomedical Innovations · Problem 7 — Forensic Autopsy · Modeled on the PLTW Guided Review format

Vocabulary to know cold

Term	Definition
Chain of custody	The signed, unbroken record of every person who handled a specimen and when, used to keep evidence a
Pre-analytical error	A mistake in collection, labeling, handling, transport, or storage that happens BEFORE a sample is analyze
Sharps container	A rigid, puncture-resistant container for needles, scalpel blades, and other sharp biohazard items.
Biohazard bag	A labeled (usually red) bag for soft infectious waste such as blood-soaked gauze and gloves.
Sample integrity	The condition of a specimen being unchanged and uncontaminated from collection through analysis.
Control sample	A sample of known value run alongside unknowns to confirm a method and instrument are working.
PCR	Polymerase chain reaction; amplifies tiny amounts of DNA so a profile can be generated.
Algor mortis	The postmortem cooling of the body, used to help estimate time of death.
Toxicology	Analysis of body fluids for drugs, alcohol, poisons, and their metabolites.
Formalin fixation	Preserving tissue in formalin at the correct fixative-to-tissue ratio to prevent degradation.

Worked examples (follow the reasoning)

Example 1. A medical examiner collects a heart-blood sample for toxicology and a liver sample for histology. List the correct handling steps from collection to storage.

- Don PPE (gloves, gown, eye protection) before contact with fluids.
- Label each container at the point of collection with case ID, specimen type, date, time, and collector initials.
- Place blood in the correct tube (e.g., preservative tube for toxicology) and liver in formalin at the proper fixative-to-tissue ratio.
- Record each specimen on the chain-of-custody form with signatures.
- Store toxicology blood cold (refrigerated/frozen); transport fixed tissue per protocol.
- Discard sharps in a sharps container and soft waste in a red biohazard bag.

Answer: Specimens are labeled at collection, logged on chain of custody, stored at the correct temperature, and waste is segregated by type.

Example 2. Why is running a known control alongside a postmortem blood-alcohol unknown important?

- Identify that the goal is a defensible toxicology result.
- Recognize the instrument could drift or reagents could fail.
- Run a control of known alcohol concentration in the same batch.
- If the control reads correctly, the method is validated for that run.
- Then the unknown's value can be trusted.

Answer: The control validates the run so the unknown result is defensible.

Practice questions (with reasoning)

1. A blood tube for toxicology is left on the counter overnight at room temperature before testing. This is an example of a:

- A. Analytical error
- B. Pre-analytical error
- C. Post-analytical error
- D. Chain-of-custody signature

Answer: B. Improper storage before analysis is a pre-analytical error that can degrade the analyte.

2. Which waste goes in the rigid puncture-resistant container?

- A. Used gloves
- B. A used needle
- C. Paper towels
- D. Empty plastic tube wrappers

Answer: B. Needles and other sharps require a puncture-resistant sharps container.

3. An autopsy specimen has no name, date, or initials on it. The biggest risk is:

- A. The cooler is too cold
- B. Loss of traceability and possible mix-up
- C. Too much fixative
- D. The PCR will fail

Answer: B. Unlabeled specimens lose chain of custody and can be confused with other cases.