

# Forensic Genetics

Module 19 – Topic 6 Answers

# Exercise 1a: Formulating Propositions

An individual is discovered looking into a house one night. The police are called and find a single cigarette butt under the window where the incident occurred. No one in the family smokes. The police have a person of interest captured on a neighbor's CCTV.

A single-source profile is obtained from the cigarette butt and the reference profile of a person of interest (POI) matches.

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$H_p$  : The evidence came from the POI.

$H_d$  : The evidence came from an unknown person.

Or, for simplicity:

$H_p$  : POI

$H_d$  : Unknown (U)

## Exercise 1b: Formulating Propositions

A complainant calls 911 to report a sexual assault in her home. She is taken to a hospital where an intimate swab is collected.

A POI is identified from the investigation and the obtained profile from the swab is fully explained by a mixture of the complainant (K) and the POI.

# Exercise 1b: Formulating Propositions

A complainant calls 911 to report a sexual assault in her home. She is taken to a hospital where an intimate swab is collected.

A POI is identified from the investigation and the obtained profile from the swab is fully explained by a mixture of the complainant (K) and the POI.

$$H_p : K + \text{POI}$$

$$H_d : K + U$$

## Exercise 1c: Formulating Propositions

A complainant is cut with a knife during an altercation. Based upon eyewitness testimony, a POI is identified.

A stain on the clothing of the POI is tested for blood, and a DNA profile is developed that is consisted with a mixture of the POI and the complainant.

# Exercise 1c: Formulating Propositions

A complainant is cut with a knife during an altercation. Based upon eyewitness testimony, a POI is identified.

A stain on the clothing of the POI is tested for blood, and a DNA profile is developed that is consisted with a mixture of the POI and the complainant.

$$H_p : \text{POI} + \text{K}$$

$$H_d : \text{POI} + \text{U}$$

Note how the direction of transfer provides important information.

# Exercise 1d: Formulating Propositions

Molotov cocktails have been thrown at random cars. An unexploded container is found in the street, and a 2 person mixture is developed from the evidence.

Two persons of interest are arrested.



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$$H_p : \text{POI 1} + \text{POI 2}$$

$$H_{d1} : \text{POI 1} + \text{U}$$

$$H_{d2} : \text{POI 2} + \text{U}$$

$$H_{d3} : 2\text{U}$$

What if circumstances indicate that they cannot both be present?

# Exercise 1e: Formulating Propositions

A complainant walking through a city park is attacked from behind and is sexually assaulted on a blanket. She didn't get a good look at the perpetrator. The police recognize the blanket as possibly belonging to a vagrant known to live near the park.

A profile obtained from the blanket is fully explained by mixing of K and POI's DNA.

# Exercise 1e: Formulating Propositions

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A profile obtained from the blanket is fully explained by mixing of K and POI's DNA.

$$H_p : K + \text{POI}$$

$$H_{d1} : \text{POI} + U$$

$$H_{d2} : K + U$$

$$H_{d3} : 2U$$