

2014-2015 Forensics Tryouts Key

Powders[55]:

For 5 points each:

- A: Glucose (C₆H₁₂O₆)
- B: Sucrose (C₁₂H₂₂O₁₁)
- C: Ammonium Chloride (NH₄Cl)
- D: Sodium Acetate (NaC₂H₃O₂)
- E: Calcium Carbonate (CaCO₃)
- F: Potassium Chloride (KCl)
- G1: Ammonium Chloride (NH₄Cl)
- G2: Potassium Chloride (KCl)

For 10 points:

1. Molly
2. James

Fibers[40]:

For five points each:

- H: Cotton
- I: Polyester
- J: Wool
- K: Silk
- L: Cotton
- M: Cotton

For 10 points:

1. Molly and James (Give 5 points for one correct response, 10 for both)

Hair [20]:

For 10 points each:

1. Kia, because it is a strand of black human hair.
2. Molly, because it is a strand of dog hair (and she had a dog).

DNA [10]:

1. Molly

Fingerprints [35]:

For five points:

1. Molly

For 10 points each:

2. Plain Whorl (5 points for only whorl)
3. Ulnar Loop (5 points for only loop)
4. Tented Arch (5 points for only arch)

Crime Analysis:

15 points each:

1. Molly often gets sick and uses a lot of cough syrup. Cough syrup contains ammonium chloride, which was powder C.
2. Kia enjoys consuming pickles and cucumbers. Powder D, sodium acetate, is used in pickling.
3. James is suspected of growing pot and possesses a lot of fertilizer at home. Potassium Chloride, which was Powder F, is often used in fertilizer.

5 points for the answer, 15 for the explanation:

4. Kia is the least likely suspect.

There was only one piece of evidence which pointed to him (5)

- which was the piece of human hair (5).

- None of the evaluation of the DNA electrophoresis, fingerprinting, powders, and fibers implicated Kai (5).

-Each of the other suspects had more evidence that pointed to them (5).

-He had no known motivation for the crime (5)

(5s include but are not limited to ways points can be given)

10 points for the answer, 40 for the explanation:

5. Molly is the most likely suspect.

-Every single genre of evidence/5 pieces of evidence pointed to her (10).

-(5 points for saying 4 /many pieces of evidence pointed to her)

- Fibers matched up (5 for correctly identifying fibers that matched, 2.5 otherwise)
- Powders matched up (ditto^)
- Gel electrophoresis matched (2.5)
- Hair matched up (5 for explaining why, 2.5 otherwise)
- Fingerprinting matched (2.5)
- Each other suspect had less pieces of evidence than her (<=gets 5, 10 for saying exactly how many)
- She had a motivation for the crime (10)

- Point values include but are not limited to ways points can be given.

6. Please disregard this question in grading the test.

Supplemental Questions:

1. LDPE (5)
2. PV (5)
3. PVC (5)
4. Medulla, Cortex, Cuticle (5 for naming, 5 for order)
5. Polymerase Chain Reaction, used for DNA replication (5 for each part)
6.
 - (5 for name and description, 5 for temperature)
 - Denaturation: the separation of DNA into two single strands; temperature of 90-100 degrees Celsius
 - Annealing: when primers bind complementary sequences to the single stranded DNA, temperature of between 30-65 degrees Celsius
 - Extension/Elongation: when DNA polymerase attaches to the primers and creates a complementary copy of the target sequence, temperature of 60-75 degrees Celsius