

## Forensics SSSS 2017 Test ANSWERS

\* point values are are labeled after answer (total 160 points)

### Qualitative Analysis (30)

1. Eye wash, antiseptic, insecticide, flame retardant (3)
2. calcium carbonate (3)
3. (total of 14 points)
  - a. Yellow (2)
  - b. No flame (2)
  - c. Melts (2)
  - d. Red (2)
  - e. "Fireworks" - red/orange (2)
  - f. Melts into caramel - very distinct smell (2)
  - g. Green (2)
4. D - calcium nitrate (4)
5. Distinguish sucrose + glucose (2)
6. Reddish brown (2)
7. Dark blue (2)

### Plastics (15)

1. Black soot is an indication of incomplete combustion as a result of surface area and amount of oxygen reacted. As the combustion occurs, oxygen cannot get to the surface as fast as carbon dioxide, carbon monoxide, and carbon do. Essentially, the black soot that remains is black carbon that has been broken away from its bonds but has not yet reacted with oxygen. (4)
2. PETE; soft drink bottles, carpet, rope, fabric, food containers (4)
3. A polymer that goes through condensation; increase molecular weight slowly with the addition of more and more atoms/groups (4)
4. Food containers, bags, plastic lumber, bottle caps, hula hoops, plastic surgery (3)

### Fibers (10)

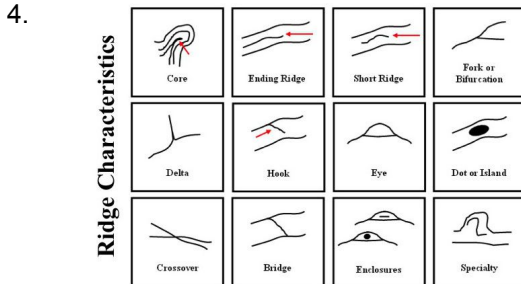
1. From left to right: wool/animal, linen/plant, polyester/synthetic, cotton/plant (8)
2. C - lycra (spandex) (2)

### Hair (20)

1. B - dog (4)
2. C - continuous (3)
3. C - MI > 1/2 (3)
4. D - cat (4)
5. A - ladder (3)
6. C - MI > 1/2 (3)

### Fingerprints (20)

1. X/Y, X(numerator):  $1 + 16 + 2 + 1 = 20$   
Y(denominator):  $1 + 16 + 8 + 4 + 1 = 30$   
 $20/30 = 2/3$  ratio (6)
2. D - magnetic powder (2)
3. From left to right - plain arch, ulnar loop, radial loop (6)



(6)

### Chromatography & Mass Spectrometry (5)

1. gasoline

*\*\* I'd like to apologize in advance and say that if this incorrect, I am so so so so sorry. My partner usually does the mass spec and i do not understand it all!! once again, terribly sorry if this is unhelpful or incorrect*

### Crime Scene Analysis (60)

Sharon Barnes (10)

- Cat hair doesn't point to her (Sharon has white cats)
- Alka seltzer ????? no need
- Sodium bicarbonate - she was baking (baking soda)
- Calcium carbonate - there's no reason for her to have this
- Fingerprints on knife - not her fingerprints
- Blood - not hers
- Bracelet - points to Sharon

Total pieces of incrimination: 2/7

Jeff Barnes (10)

- Cat hair doesn't point to him (they have white cats)
- Alka seltzer for heart problems
- Sodium bicarbonate - could have rubbed on him from when Sharon was baking, but generally unlikely
- Calcium carbonate - no reason
- Fingerprints on knife - the knife belongs to him, so of course his fingerprints are on it
- Blood - not his
- Bracelet - Sharon

Pieces: 2/7 or 3/7

Margaret ("Margie") Smith (10)

- Cat hair points to her (color unspecified, but her cat is orange)
- Alka seltzer - no need
- Sodium bicarbonate - she baked gluten free cookies (baking soda)
- Calcium carbonate - dietary supplements because she leads a gluten free lifestyle

- Fingerprints on knife - not hers
- Blood - hers
- Bracelet - not hers

4/7

Martha Johnson (10)

- Cat hair - not her, she has a dog
- Alka seltzer - no need
- Sodium bicarbonate - no need
- Calcium carbonate - no need
- Fingerprints - not hers
- Blood - not hers
- Bracelet - not hers

0/7

Carol Johnson (10)

- Cat hair - could be hers, she has a brown cat
- Alka seltzer - no need
- Sodium bicarbonate - no need
- Calcium carbonate - no need
- Fingerprints - not hers
- Blood - not hers
- Bracelet - not hers

1/7

- Baking soda could also be on Barbara from when she made pizza

\*\*\*\* the paragraph is 6 points for being written, it is only 4 points for identifying the correct criminal \*\*\*\*

From a numerical standpoint, it is clear that the murderer is Margaret Smith. In comparison to the others, 4/7 of the evidence pieces point to her as the killer, which is more than half of the evidence provided. The cat hair could be from her cat. Although the color of the hair found at the crime scene was unspecified, it was stated that it was not white; Margaret's cat is orange, thus making it possible that it was her cat's hair that was on Barbara. Sodium bicarbonate, otherwise known as baking soda, was on Margaret from her baking. The calcium carbonate was part of a dietary supplement that she took in order to compensate for the gluten free lifestyle she leads. And of course, the blood on the knife belongs to her. Her possible motivation for killing Barbara is simply because of her passive aggressive attitude towards Margaret. There were tensions between the two over their children's soccer games, and maybe this was the final straw for Margaret. (10)