

Your Name _____

Student No. _____



Section 2 Assignment: Part 5

Chemical Signatures

The local RCMP receives a tip that drugs are being sold out of a downtown bakery. They stake out the business and catch a man coming out with a large package full of white powder. The police arrest him and seize the package as evidence. The package is then sent to the lab for analysis.

1. At the lab, a forensic chemist runs a series of tests to determine what the white powder inside the package is. Here are the results:

- No odour
- No reaction to water
- No reaction to acetic acid
- No reaction to phenolphthalein
- No reaction to iodine.
- Turns blue when exposed to cobalt thiocyanate

Using the table provided, identify the mystery powder inside the package. (1 mark)

Substance	Physical Properties			Chemical Properties				
	Colour	State	Odour	Reaction to water	Reaction to acetic acid	Reaction to phenolphthalein	Reaction to Iodine	Reaction to cobalt thiocyanate
ASA (aspirin)	white	solid powder	none	bubbles violently	none	turns pink	none	none
baking powder	white	solid powder	none	none	fizzes violently	none	none	none
cornstarch	white	solid powder	none	none	none	none	turns purple	none
Tri-sodium phosphate	white	solid powder	soapy	none	fizzes	turns pink	none	none
Cocaine	white	solid powder	none	none	none	none	none	turns blue

Type of powder: _____

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2. Fine white powder is also found on the outside of the package. This is also tested. Here are the results:

- Soapy odour
- No reaction to water
- Fizzes in acetic acid
- Turns pink in phenolphthalein
- No reaction to iodine

Using the table provided at the beginning of this assignment, identify the mystery powder *outside* the package. (1 mark)

Mystery powder: _____

3. After all the customers and employees have been interviewed, you narrow your list of suspects down to four. Your job is to try to establish which of the four suspects was involved in the drug operation. You decide to collect trace evidence from the suspects themselves to see if you turn up any clues. When you're done, you send these samples to the forensic chemists at the lab for analysis.

Evidence collected from Stuart Miller, owner and baker

- a. white powder from hands: white, solid powder; no odour, does not dissolve, fizzes violently in acetic acid; does not react to either phenolphthalein or iodine.

This powder is: _____

- b. white powder from apron: white; powder; no odour; no reaction to water, acetic acid or phenolphthalein; turns purple with iodine.

This powder is: _____

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Evidence collected from Lucinda Lee, Front Till Manager

- c. Powder from her jacket: white; solid powder; no odour; does not dissolve; fizzes violently in acetic acid; does not react to either phenolphthalein or iodine.

This powder is: _____

Evidence collected from Oscar Meyers, cleaner/worker:

- d. Powder on his hands: white; powder; soapy odour; no reaction to water; fizzes in acetic acid; turns pink in phenolphthalein; no reaction to iodine.

This powder is: _____

Evidence collected from Sharon Bell, Health Inspector:

- e. Trace amounts of white powder on her hands: white; powder; no odour; bubbles violently in water; no reaction to acetic acid; turns pink in phenolphthalein; no reaction to iodine.

This powder is: _____

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4. Based on the chemical evidence you have gathered, describe why or why not each of these people is still a suspect in this case. (4 marks)

a. Stewart Miller

b. Lucinda Lee

c. Oscar Meyers

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d. Sharon Bell

e. Based on all of the above, your most likely suspect is: (1 mark)

f. Is this enough to convict the suspect of the crime? Why or why not?
(3 marks)

Evaluation Guidelines	Marks
Chemical Signatures	15
Total Marks	/15