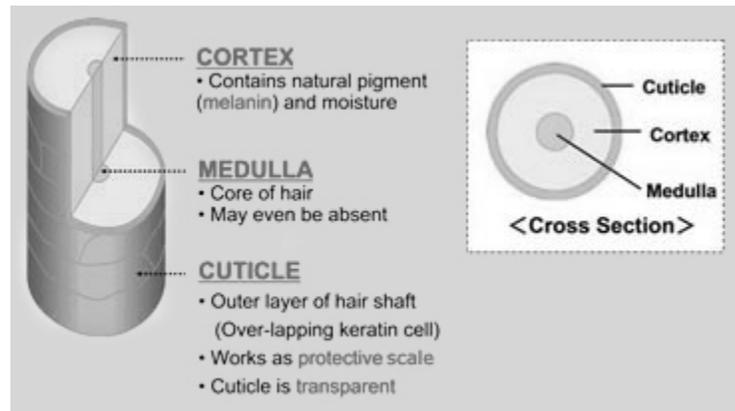


YUSO 2017 FORENSICS

ANSWER KEY

Section I

1. A
2. a) Carbon dioxide
b) B
3. A
4. C
5. Hydrogen bonds
6. It does not match any of the suspects' DNA.
7. It was not useful because it does not point to any of the suspects. It is possible however because the statue is in a public place, and many people touch it throughout the day so the chances of getting a match is very slim. (allow mark if discussed in Q6)
8. Expect diagram as follows. Root should be marked at the bottom of the hair. Functions not required.



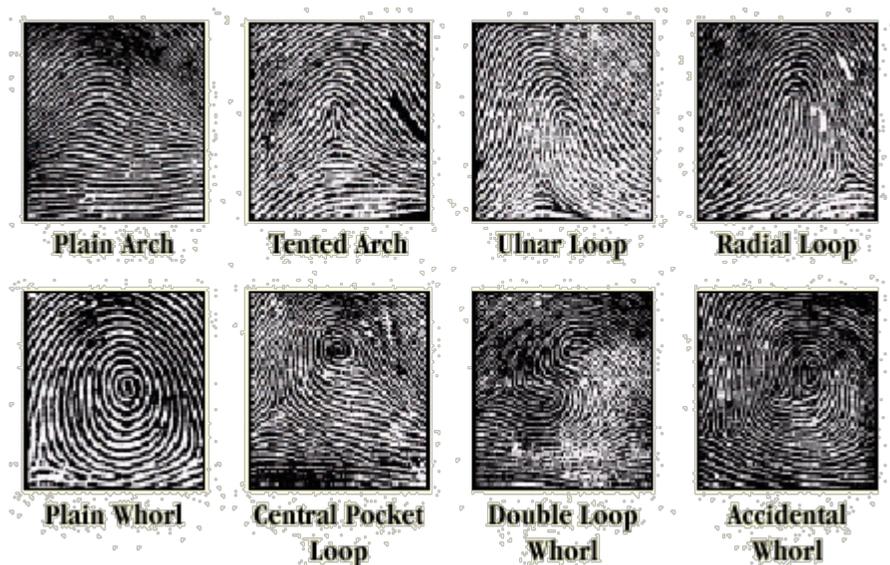
9. Thickness: Dog hair more dense.
Nature: Dog's hair coarse and short. Human hair long and soft.
Growth: Human hair tends to grow independently and does not stop growing. Dog hair grows in a synchronized manner, like fur, and stops growing after a while.
10. Human.
Consistent color and pigmentation throughout the shaft.
Animal pigmentation is centrally located.
11. None of the suspects specifically.
12. a) The following procedure summarized:

- Cut the chromatography strip out of the coffee filter (or other paper, see above).
- The length of the strip depend on the height of the chamber the width does not matter but it should be able freely get in the chromatography chamber.
- Draw a pencil line one inch from the bottom of the strip. It will be you start line. For our black marker experiment draw short line along the start line. If you're trying to separate something else put your sample(s) on the start line with small capillary or toothpick.
- Pour solvent into the chromatography chamber (jar) just to cover the bottom.
- Put the strip of the chromatography paper with sample(s) in the chromatography chamber, so that bottom of the strip touches the solvent. Important! Start line should stay above the solvent!
- You'll see how solvent "climbs" up the strip dragging the sample with it. Watch color spot going up the strip and possibly separating on individual components.
- Remove paper from the chamber when solvent front are inch or two away from the top or if it doesn't move up any more.
- Mark where the solvent front is and where are the middle of the color spots (if you lucky to get any).
- Write the solvent combination and proportions on the strip for future reference.

b) If certain reference color sample will travel the same distance (rf) that one of the black marker colors both of them likely to be the same chemical compound.

13. Jake because the spots from his ink travelled the same distance as those from the crime scene.

14. (0.75 points each)



15. Jake. Any suitable explanation e.g. parallel circles/whorls

16. Jake

Section 2

1.

Set up your iodine fuming chamber and fill the pan that it sits in with hot tap water.

Place the specimen inside the chamber, either suspended from a stiff wire or against the inside wall of the chamber, with the print side toward the interior of the chamber. Turn on the fume hood or exhaust fan. Sprinkle a few small crystals of iodine into the bottom of the chamber and replace the cover. The crystals should begin sublimating immediately, filling the chamber with violet vapor. If the chamber or lid is transparent, you should see latent prints becoming visible within a few seconds as orange smudges.

Allow the fuming to continue until the ridge detail is evident in the developing prints. Depending on the specimen and the amount of iodine vapor present, this may anything from just a few seconds to a minute or more.

When development appears to be complete, quickly remove the specimen from the chamber and replace the lid. You can use the iodine vapor already present in the chamber to develop additional specimens, adding a few more iodine crystals as required to keep the chamber filled with iodine vapor.

Place the specimen on a clean, flat surface and examine it carefully under strong light with the magnifier or loupe. You should see fingerprints revealed in considerable detail.

Spray the specimen with the cornstarch solution to develop the prints. You needn't drench the specimen; a gentle misting is sufficient. As the iodine reacts with the starch, the color of the developed prints changes to blue-black.

For better results, use dirty fingerprints, especially on paper.

2. Splash goggles, gloves, and protective clothing. Use fume cupboard. Be careful not to inhale the iodine vapor, which is irritating and has a strong chlorine-like odor.

Section 3

6 points for each question asked. Look for linking of evidence to the criminal (Jake). For e.g. even though the time taken to travel to Old Campus was 15 minutes, Jake travelled quickly as his absence times show because he was an athlete. Rejected DNA evidence because many students/tourists touch the statue and so odds were slim. Ink evidence pointed to Jake, which may be conclusive. Fingerprints pointed to Jake. Any justifiable explanation is correct.