Forensic Science Final Exam Review

Human Identity (Fingerprints, Forensic Anthropology, DNA)
1. Who developed the system known as anthropometry?
2. Who postulated the exchange of evidence principle?
3. In comparing footwear samples, you look for both class and individualizing characteristics. Give examples of each.
4. What are 4 factors that can be rightfully cited as an explanation for the rapid growth of crime labs during the last 25 years?
5. Which unit has the responsibility for the examination of body fluids and organs for the presence of drugs and poisons?
6. The final evaluator of forensic evidence is the _____.
7. The first rule in crime scene photography is:
8. What factors help an investigator decide how to search a crime scene?
9. Any object that can establish that a crime has been committed or can link a crime and its victim or perpetrator is called _________________.
10. Whose responsibility is it to secure the crime scene?
11. Why must notes be taken during the documentation of a crime scene?
12. Hair samples, blood samples, bullets, hand swabs, etc, are all evidence that would logically found or taken at what kinds of crime scenes?
13. List some techniques scientists use in order to be able to visualize latent fingerprints:
14. Which skeletal features are most useful in estimating skeletal age?
15. The _______ and the _______ are the most sexually dimorphic features of the human skeleton.
16. The analysis of skeletal remains within a legal investigation is called _________.
17. How do male and female skeletons compare prior to puberty? Which features about the human skeleton allow us to determine gender? Age? Stature?
18. What is “The Body Farm”?
19. The cooling of the body after death is referred to as _____________. 
20. Loops, whorls, and arches are considered to be which type of characteristic? (Class, individual, etc)

21. Under which circumstances have two people been found to have identical fingerprints?

22. What is AFIS? What is CODIS?

23. From whom, and in what proportions, do you inherit your DNA?

24. Why is DNA considered to be the “gold standard” of identification?

25. Under what circumstances might two people have identical DNA?

26. How is DNA analyzed (2 lab techniques that we discussed)?

27. How is the identification of a victim, suspect, etc. different in reality from what is portrayed in TV crime series?

28. What does a forensic odontologist study? What kinds of evidence might s/he analyze?

29. Are crime labs infallible?

**Trace Evidence Analysis and Identification**

30. In general, hairs and fibers are difficult to individualize. Because of this, they are considered to have mainly ______ characteristics.

31. The central region of a hair may contain a structure called the _______, which may be continuous, interrupted, or fragmented.

32. The _________________ is the part of the hair that is most likely to contain DNA.

33. If DNA is found from hair and is matched to a known DNA sample, then the hair is considered to have ___________ characteristics.

34. One difference between human and animal hair is the frequent absence of the ____ in humans.

35. The outer layer of a hair is the _________________ and it is covered in ______________.

36. The natural color of a strand of hair is determined by the number and concentration of _______ which are made of forms of _______.

37. Synthetic fibers are made of large molecules called ________, which are made of smaller repeating units called __________. These fibers are mass produced. Why is that a problem for forensic scientists?

38. Give 4 examples of natural fibers. What is the most common one?
39. The first 2 characteristics that a fiber expert will compare in synthetic fiber sample are

40. One characteristic of a fiber can be that it might have two different indices of refraction. The difference between these indices is called ________.

41. List (in order) the three stages of hair growth.

42. This hair growth stage is characterized by rapid cellular division in the root:

43. Paint evidence is often analyzed by crime labs. What value can it have? What tools do experts use to analyze and compare paint samples?

44. Soil (and other related material) is best examined by a forensic ________.

45. Soil can be useful evidence because:

46. What role did trace evidence play in the McDonald murder case?

47. What famous case involved the analysis of trace metals?

**Tools of the Forensic Scientist**

48. What is one effect of the fact that light is a form of electromagnetic radiation?

49. What is the mathematical relationship between the frequency, wavelength, and speed of light?

50. As wavelength increases, which color end of the visible spectrum is approached (blue or red)?

51. What is refraction?

52. In two of your labs, you used a device called a colorimeter. This instrument could be set at different wavelengths and was able to measure the ________ of light by a solution.

53. The general relationship between absorbance and concentration is known as ________ law, and is what kind of mathematical relationship?

54. How would the relationship in #48 look in a graph?

55. How could we use the colorimeter in a forensics lab? (What applications could it have?)

56. What is the name for the little containers that we used in the colorimeter?

57. What does each of the following do: gas chromatograph, mass spectrometer, FTIR, thin layer chromatography? For each, test, indicate whether the results are definitive or presumptive.

58. How is gas chromatography used in tandem with mass spectrometry?
59. What is an analyte in a chemical testing situation?

60. Differentiate between the electron microscopes, comparison microscope, stereomicroscope, compound light microscope, and micro-spectrophotometer. (What is each “good for?”)

**Advanced Crime Scene Topics**

61. What can investigators tell about a crime from bloodstains? (List at least 3 things)

62. How does the shape of a blood stain change as the angle of impact increases (from zero to 90 degrees)?

63. Bloodstains that are created when the force acting on the blood is gravity are called __________.

64. The smaller the size of the droplets in a spray of blood spatter, the:

65. How do experts determine the angle of impact of a bloodstain?

66. How do experts determine where in a space (such as a room) a blood spatter-producing event occurred?

67. How can an expert tell which way a blood drop was traveling before it hit a surface?

68. Be able to calculate angle of impact, find areas of convergence, etc.

69. How do investigators find blood evidence that is not visible to the naked eye? (More than one test)

70. Are the test that you listed in #69 presumptive or confirmatory? Explain.

71. What is PMI, and how are insects used to estimate it?

72. What factors affect the ability of adult flies to find a corpse and lay eggs on it?

73. The air temperature of the surroundings of a body is called the __________ temperature.

**Firearms and ammunition identification**

74. Any mark made in a softer surface by a harder implement is called a _____.

75. The purpose of the rifling in a barrel is to:

74. The rifling lands leave deep marks in a bullet as it travels through the barrel, and the grooves leave raised areas on the bullet. Within these impressions are microscopic scratches called __________. These are unique to the firearm, so they are considered to have __________ characteristics.
Miscellaneous Diagrams

75. (Fingerprint pattern chart)

<table>
<thead>
<tr>
<th>Name of Pattern</th>
<th>Incidence In US (most common/least common)</th>
<th>Description of ridge lines</th>
<th>Deltas (absent, one, two)</th>
<th>Sub-types</th>
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76. Label the hair diagrams:

77. Be able to determine Rf values from a TLC plate (diagram)

78. Be able to label the parts of a compound light microscope.

79. Be able to recognize a human hair vs an animal hair

80. Be able to recognize characteristics of female skeletal parts vs male
81. Be able to identify the following structures/features of a human skeleton (may not be the same diagrams, and you do need to know the major skull features that we learned- ie: occipital protuberance, nasal spine, zygomatic bone):