1st Semester Forensics Review

You must complete 100% of this review in order to receive a 10 point bonus on your final. All answers must be correct. This assignment is ALL OR NOTHING. All review packets are due on the day of your final at the beginning of the class period. They will not be accepted late for ANY REASON. Follow the instructions below, if instructions are not followed, no credit will be given.

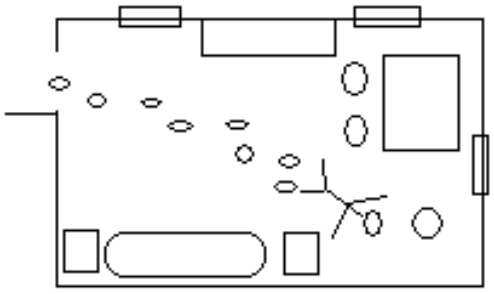
You must write out the question and answer for all of the following questions.

- If it is a free response question, your answer must fully answer the question.
- For T/F questions, you must write the statement, and then EXPLAIN why you chose False, if false (not just T/F).

Questions:

1. Define forensic science
2. What was the name of the first system of personal indemnification? What criteria did it use to distinguish individuals?
3. What is Locard's Exchange Principle?
4. Describe the criteria for admissibility of scientific evidence as laid out in *Frye v. United States*.
5. In its decision in *Daubert v Merrell Dow Pharmaceuticals Inc*., whom did the US Supreme Court charge with ensuring that an expert's testimony rests on a reliable foundation and is relevant to the case?
6. What is an expert witness?
7. What is physical evidence? Give three examples of physical evidence that may be found at a crime scene.
8. What is the first step in processing a crime scene?
9. Why is it important to separate the witnesses at a crime scene?
10. Describe how to make a paper bindle and explain why it is a better way to store trace evidence than an ordinary mailing envelope.
11. Why should all items of evidence be placed in separate containers?
12. What is the chain of custody, and why is it important to maintain a chain of custody?
13. Name one type of evidence that should be stored in an airtight container and one type that should not be stored in such a container. Explain why each type of evidence should be stores or not stored in this way.
14. True/False: Generally speaking, the chances of an investigator finding physical evidence possessing individual characteristics is far greater than finding class physical evidence.
15. Define individual characteristics and give two examples.
16. What is the greatest weakness of class physical evidence? What is the main reason for this weakness?
17. What is the value of class physical evidence?

18. What important elements are missing from the following crime scene sketch? Give a minimum of three.



19. What is the pharmacological definition of a narcotic?
20. What is a hallucinogen? Name three commonly used hallucinogens.
21. In what class of drugs do alcohol and barbiturates belong? What is the main physiological effect of such drugs?
22. What is a stimulant? Name two widely used stimulants.
23. What are anabolic steroids? Why were they developed?
24. What does spectrophotometry use as a light source?
25. True/False: Infrared spectrophotometry allows for the identification of different materials because different organic substances always produce distinctive infrared spectra.
26. What is the difference between a screening test and a confirmation test?
27. Why is chromatography particularly well suited to the needs of a drug analyst?
28. True/False: The standard test used to determine whether a blood stain is of human or animal origin is the precipitin test.
29. What is plasma?
30. What are antigens and antibodies? What part of the blood contains antibodies?
31. Describe how antibodies and antigens determine ones A-B-O blood type.
32. What is the fourth important antigen other than A, B, O?
33. What happens when a serum containing B antibodies is added to red blood cells carrying the B antigen? Will the same things happen if serum containing B antibodies is added to red blood cells carrying the A antigen? Explain your answer.
34. What is the difference between a heterozygous gene pair and a homozygous gene pair?
35. Define genotype and phenotype.

36. Draw the Punnett squares for the following scenarios:
    a. Greg's father has heterozygous type A blood and his mother has type AB blood.
    b. Dale's father has AB blood and his mother had homozygous type A blood.
    c. Maura's father and mother both had heterozygous type B blood
37. Using the Punnett squares from question 36 answer the following questions:
    a. Based on the Punnett squares above, which blood type(s) is most likely to be expressed? Which blood type is least likely to be expressed? Explain your answer.
    b. What blood type is Greg most likely to have? Explain your answer.
    c. Which of the three people (Greg, Dale, and Maura) are least likely to have type B blood? Explain your answer.
    d. In which, if any, of the three people may a recessive gene express itself? Explain your answer.
38. Using your information from questions 36, suppose Greg and Maura have a child.
    a. Construct all of the possible Punnett squares for that child.
    b. What blood type(s) is the child most likely to have?
    c. What genotype(s) is the child most likely to have?
39. True/False: The latest, most successful, and widely used DNA profiling procedure is the short tandem repeats.
40. True/False: Mitochondrial DNA is found outside the nucleus of the cell and is inherited solely from the mother.
41. What is DNA and why is it important to forensic scientists?
42. Describe the basic structure of the DNA molecule. What is the name given to this type of structure?
43. Name the four bases associated with DNA. How are these bases paired on the DNA molecule?
44. What is PCR? Why is it useful to forensic scientists?
45. What are tandem repeats? How are they useful to forensic scientists?
46. What is CODIS? How is CODIS useful to forensic scientists?
47. True/False: Movement of a bloody object across a surface causes the pattern to darken as the object moves away from the point of contact.
48. How can an investigator tell the direction of travel of blood from the shape of the bloodstain?
49. What is the difference between the shape of a bloodstain that impact a surface at a low angle and one that impacts at a higher angle?
50. In general, as the velocity of the impact increases, what happens to the diameter of the resulting blood drops?
51. Define the terms area of convergence and area of origin.

52. What is expirated blood? How can you distinguish expirated blood from other types of blood spatter?
53. What is a void pattern? How might this pattern be useful to investigators?
54. What is a transfer pattern? How might this pattern be useful to investigators?
55. What is a flow pattern? What should one surmise if a flow found on an object or body does not appear consistent with the direction of gravity?
56. True/False: Because of advances in forensic technology and the equipment available, it is now possible to individualize human hair through its morphology.
57. Name and briefly describe the three layers of the hair shaft.
58. What is the difference between the medulla in human hairs versus animal hairs?
59. Name the three phases of hair growth.
60. A criminalist is most likely to collect DNA from hairs in which stage of growth? Why?
61. List 5 examples of natural fibers. Describe each.
62. List 5 examples of synthetic fibers. Describe each.
63. True/False: The most common type of fingerprint pattern is the arch pattern.
64. True/False: AFIS makes it possible to search a single latent crime scene fingerprint against an entire file's print collection.
65. What imparts individuality to a fingerprint?
66. What are the three main types of fingerprint patterns?
67. Which fingerprint pattern includes ridge patterns that are generally rounded and circular?
68. Which fingerprint pattern has ridges entering from one side of the print and exiting from the same side?
69. List the steps of ACE-V and describe each step.
70. Name and describe the three types of prints you may find in a crime scene.
71. Name four common chemical methods for developing latent prints. Describe a specific use for each.
72. Describe the basic process to dust for and lift a fingerprint.
73. Draw and name 6 different types of minutia you might find in a fingerprint.
74. List the seven s's of crime scene investigation in order
75. Name and draw 5 different types of medulla patterns
76. A toxin is found in the hair 3 cm from the room. How long has it been since this toxin was ingested? You must show all of your work to receive full credit.

77. A hair has a total diameter of 65 µm and a medulla diameter of 16 µm. What is the medullary index of this hair? Is it human or animal? Explain how you reached this conclusion. You must show all of you work to receive full credit.

78. Describe how fibers could be used to solve a crime where fiber evidence is present.

79. Plant fibers all share what polymer in common?

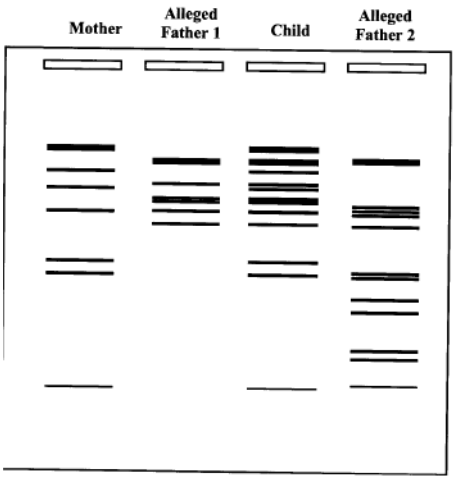
80. What is forensic palynology?

81. List the three modes of pollen transportation.

82. Describe how pollen could be used to solve a crime where pollen was present.

83. List the 5 ways to avoid contamination in the collection and preservation of DNA.

84. Use the electrophoresis gel below to determine which of the following men (if any) is the father of this child.



85. The police received a 911 call from a local residence saying that a murder has taken place. When the police arrive, the find a recently dead individual. The CSI Unit searches the crime scene for any evidence and find a still sticky piece of gum. Based on how sticky the gum still is, CSI believes it was recently left there. A DNA analysis is done on the gum and it comes back as a match to an individual, Adam Smith. Will this evidence be enough to convict Adam of the murder? Why or why not? Use complete sentences and give an example to support your answer.

86. True or False: Processing the electronic crime scene has very little in common with processing a traditional crime scene and requires that the investigator take a substantially different approach.

87. True or False: The goal in obtain data from a HDD is to do so without altering any data.

88. What is the difference between hardware and software?

89. What is a computer's motherboard?

90. What is firmware? What is another name for firmware? Why is it important to forensic computer investigation?

91. What are sectors and clusters? How are they related to one another?

92. What is a FAT and what purpose does it serve?
93. What is slack space?
94. List three places where a forensic computer examiner might look to determine what websites a computer user visted.
95. What is a firewall and how does it work?