

BCJ 351

Forensic Science

Text: Criminalistics: An Introduction to Forensic Science

Tenth Edition, 2011

ISBN-13: 978-0-13-504520-6

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Publisher: Pearson Prentice Hall



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Final Examination

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Multiple Choice Questions (Enter your answers on the enclosed answer sheet)

1. Who undertook the first definitive study of fingerprints as a method of personal identification?
 - a. Gross
 - b. Lattes
 - c. Locard
 - d. Goddard
 - e. Galton

2. Who established the comparison microscope as the indispensable tool of the modern firearms examiner?
 - a. Goddard
 - b. Osborn
 - c. Gross
 - d. Lattes
 - e. Galton

3. Approximately how many operating crime labs are there in the United States (federal, state and country)?
 - a. 300+
 - b. 200
 - c. 75
 - d. 250
 - e. 150

4. Which unit has the responsibility for the examination of body fluids and organs for the presence of drugs and poisons?
 - a. trace evidence unit
 - b. toxicology unit
 - c. physical science unit
 - d. evidence collection unit
 - e. biology unit

5. The final evaluator of forensic evidence is the _____.
 - a. media
 - b. accused
 - c. jury
 - d. prosecutor
 - e. police

6. What is the LEAST important consideration in the gathering of evidence at a crime scene?

- a. completion of the chain of custody documents
- b. competent collection of materials
- c. guilt of the suspect(s)
- d. proper recognition of the evidence
- e. adequate preservation of samples

7. Forensic odontology refers to the study of _____.

- a. pollen
- b. drugs
- c. rocks
- d. bones
- e. teeth

8. Which of the following services are typically provided to law enforcement crime laboratories?

- a. psychology
- b. odontology
- c. criminalistics
- d. polygraph
- e. pathology

9. Which of the following individuals was not an earlier contributor to the field of forensic toxicology?

- a. James Marsh
- b. Alphonse Bertillon
- c. Mathieu Orfila
- d. Carl Wilhelm Scheele
- e. Valentin Ross

10. The case of *Coppolino v. State* highlights issues dealing with _____.

- a. the acceptability of new scientific tests
- b. warrantless searches
- c. the admissibility of the polygraph
- d. the evidential value of confessions
- e. search and seizure

11. The tendency of the public to believe that every crime scene will yield forensic evidence and their unrealistic expectations that a prosecutor's case should always be bolstered and supported by forensic evidence is known as _____.
- a. jurisprudence
 - b. anthropometry
 - c. the scientific method
 - d. the CSI effect
 - e. Locard's principle
12. A crime scene which involved the collapse of a structure would be analyzed by specialists in the area of _____.
- a. criminalistics
 - b. forensic engineering
 - c. forensic computer and digital analysis
 - d. forensic entomology
 - e. forensic error analysis
13. The conditions at a crime scene can be compromised by all of the following actions EXCEPT:
- a. turning a faucet on at the crime scene
 - b. taking photographs at the crime scene
 - c. smoking at the crime scene
 - d. adjusting the temperature of the crime scene
 - e. eating food at the crime scene
14. The size and location of the crime scene as well as the events that occurred there will determine the _____.
- a. number of personnel who will process the evidence at the crime laboratory
 - b. kind of evidence that will be missing
 - c. kind of search pattern that is used to locate evidence
 - d. amount of care that must be taken during the crime scene search
 - e. time at which the crime scene is searched
15. The advantages of tape-recording crime scene notes on an audio tape include all of the following EXCEPT:
- a. the investigator's hands are free to carry out other tasks while recording the notes
 - b. audio tapes have the added security feature of preventing erasure or taping over if the security tab on the tape is removed
 - c. the notes can be recorded at the crime laboratory instead of at the crime scene
 - d. the notes are recorded as the observations are made
 - e. all of the above are advantages of tape-recording notes

16. Digital crime scene photographs require special measures to assure their admissibility in court due to _____.
- a. the inability to manipulate the images
 - b. their poor quality
 - c. the difficulty involved in compressing the file size
 - d. the ability to manipulate the images
 - e. the lack of availability of digital cameras
17. A victim's fingernail scrapings would be correctly packaged in _____.
- a. a druggist fold
 - b. a plastic Ziploc® bag
 - c. sealed, airtight containers
 - d. both b and c
 - e. None of the above.
18. The successful outcome of a criminal investigation is almost always directly related to _____.
- a. the number of people employed in the crime lab
 - b. the volume of the physical evidence collected
 - c. the manner in which the evidence is collected and preserved
 - d. whether the crime is considered high profile
 - e. the complexity of the crime
19. Which type of evidence must be packaged separately from other evidence?
- a. DNA-containing evidence
 - b. biological stain evidence
 - c. arson evidence
 - d. a and b
 - e. All of the above.
20. Which is NOT a manner of death?
- a. accident
 - b. natural
 - c. homicide
 - d. suicide
 - e. drowning

21. What part of a decedent's body resists rapid decomposition and is used by forensic anthropologists to provide information about the decedent?
- a. cartilage
 - b. bones
 - c. soft tissue
 - d. teeth
 - e. hair fragments
22. Insect evidence should be collected _____.
- a. upon the finding of the decedent by the first responding officer
 - b. at the crime laboratory by forensic analysts
 - c. only from the body
 - d. at the scene by a forensic entomologist or trained investigator
 - e. during the autopsy by the medical examiner
23. Typically, about an hour after death, a deceased body loses heat at a rate of approximately _____ until the body reaches the environmental temperature.
- a. 1-1½°F per minute
 - b. 1-1½°C per hour
 - c. 12 °F per hour
 - d. 0.1-0.2°C per hour
 - e. 1-1½°F per hour
24. To determine the gender of skeletal remains, a forensic anthropologist can examine all of the following area of the skeleton EXCEPT:
- a. femur
 - b. pelvis
 - c. cranium
 - d. sacrum
 - e. skull
25. The _____ is a national fingerprint and criminal history system maintained by the FBI and launched in 1999.
- a. National Integrated Ballistic Information Network (NIBIN)
 - b. Automated Fingerprint Identification System (AFIS)
 - c. Shoeprint Image Capture and Retrieval (SICAR)
 - d. Paint Data Query (PDQ)
 - e. Integrated Automated Fingerprint Identification System (IAFIS)

26. The weight 264.45 grams can be correctly expressed as _____.
- a. .26445 kilograms
 - b. 26,445 decigrams
 - c. 26.445 centigrams
 - d. None of the above.
 - e. All of the above.
27. The use of the Celsius temperature scale by scientists is _____ their use of the Fahrenheit temperature scale.
- a. less than
 - b. greater than
 - c. the same as
28. The freezing point of water in Fahrenheit is _____ the freezing point of water Celsius.
- a. less than
 - b. greater than
 - c. the same as
29. The process of a glass prism separating sunlight into component colors is called _____.
- a. birefringence
 - b. dispersion
 - c. sublimation
 - d. refraction
 - e. reflection
30. Pyrex glass _____.
- a. is made with the addition of boron oxide
 - b. is bullet-proof
 - c. is put through an annealing process
 - d. has been tempered
 - e. is laminated
31. What is the logical first step in soil analysis?
- a. investigation of the geographical and/or geologic origin of the sample
 - b. examination for presence of debris under low-power magnification
 - c. examination of minerals and rocks under high-power magnification
 - d. comparison of dried soil sample for color and texture
 - e. use of the density-gradient tube technique

32. _____ is the visual effect caused by an object's absorption of certain portions of the visible light spectrum and transmission or reflection of others.
- a. Color
 - b. Electricity
 - c. Refractive index
 - d. Density
 - e. Dispersion
33. To explain the events that occur after radiation is absorbed by a substance, light must be characterized as a _____.
- a. stream of discrete particles
 - b. wave of constant frequency
 - c. wave consisting of non-discrete particles
 - d. stream of amorphous particles of varying density
 - e. wave of variable frequency
34. The refractive index of a medium is determined by the ratio of _____.
- a. density of light in the medium to density of light in a vacuum
 - b. velocity of light in a vacuum to frequency of light in a medium
 - c. angle of refraction to angle of incidence
 - d. velocity of light in a vacuum to velocity of light in a medium
 - e. frequency of light in a vacuum to frequency of light in a medium
35. A(n) _____ property describes the behavior of a substance without reference to any other substance while a _____ property describes the behavior of a substance when it reacts or combines with another substance.
- a. chemical; biological
 - b. physical; biological
 - c. optical; chemical
 - d. optical; birefringent
 - e. physical; chemical
36. Which physical state has volume but no specific shape?
- a. gas
 - b. liquid
 - c. solid
 - d. No such state exists.
 - e. a and b

37. Thin-layer chromatography was performed and four spots were visualized on the glass slide. The substance with which R value was least soluble in the stationary phase is which of the following?
- a. R value .2
 - b. R value .5
 - c. R value .7
 - d. R value 10.0
 - e. R value 8.5
38. Which color of the visible spectrum has the highest frequency and the shortest wavelength?
- a. red
 - b. yellow
 - c. pink
 - d. green
 - e. violet
39. The photons of which source have the LEAST amount of energy?
- a. microwaves
 - b. gamma rays
 - c. visible light waves
 - d. infrared rays
 - e. radio waves
40. Spectrophotometry utilizes which light source?
- a. visible
 - b. infrared
 - c. UV
 - d. All of the above.
 - e. None of the above.
41. The quantity of a substance separated by gas chromatography can be determined by its _____.
- a. R value
 - b. peak area
 - c. IR absorption profile
 - d. retention time
 - e. total electric charge

42. The details of the pattern of an infrared (IR) spectrograph are _____ the details of an ultraviolet (UV) spectrograph.
- a. unrelated to
 - b. greater than
 - c. the same as
 - d. less than
 - e. None of the above.
43. What type of evidence would be expected to have trace elements?
- a. paint and bullet fragments
 - b. soil and gun primer particles
 - c. glass and metal objects
 - d. All of the above.
 - e. None of the above.
44. In a simple emission spectrograph, excitation of the specimen under investigation is accomplished with a(n) _____.
- a. electrical arc
 - b. inductive magnetic field
 - c. ultraviolet light source
 - d. hot plasma torch
 - e. activated prism
45. In atomic absorption chromatography, the amount of light absorbed is _____ to the concentration of the element in the test sample.
- a. not related
 - b. parallel
 - c. directly related
 - d. indirectly related
 - e. perpendicular
46. The nucleus of an atom contains _____.
- a. neutrons and electrons
 - b. protons and neutrons
 - c. electrons only
 - d. protons and electrons
 - e. neutrons

47. An element is selective in the frequency of light it will absorb. This selectivity is due to its _____.
- a. number of neutrons
 - b. atomic mass
 - c. electron energy levels
 - d. proton cloud
 - e. atomic number
48. Which type of radiation is NOT given off by radioactive decay?
- a. gamma rays
 - b. alpha particles
 - c. beta particles
 - d. X-rays
 - e. electromagnetic radiation
49. Neutron activation analysis involves bombarding specimens with neutrons and then measuring the resultant _____ rays.
- a. alpha
 - b. beta
 - c. ultraviolet
 - d. gamma
 - e. X-rays
50. Which of the following is a non-destructive technique for identifying and quantifying trace elements in a test sample?
- a. carbon arc emission spectrometry
 - b. atomic absorption spectrometry
 - c. neutron activation analysis
 - d. ICP emission spectrometry
 - e. microscopic examination
51. What is NOT true about X-ray diffraction?
- a. It provides information as to how elements are combined in compounds.
 - b. It can only be applied to solid crystalline materials.
 - c. It can be used in tandem with other inorganic analysis techniques.
 - d. It provides unique "fingerprints" for each compound.
 - e. It has outstanding sensitivity.

52. A compound microscope is equipped with two objective lenses (10x and 45x) and has a 10x ocular lens. The highest magnification attainable with this instrument is _____.
- a. 450x
 - b. 650x
 - c. 4500x
 - d. 65x
 - e. 100x
53. In order to examine an opaque object with a compound microscope, one must _____.
- a. use transmitted illumination
 - b. use reflected illumination
 - c. stain the object before viewing it
 - d. light the object from beneath the stage
 - e. use infrared analysis
54. A parfocal microscope _____.
- a. has two ocular lenses
 - b. allows for ease of focusing when switching from low to high power
 - c. requires the use of a fluorescent light source
 - d. eliminates the need to stain the specimen to be viewed
 - e. requires a polarized light source
55. The condenser of a compound microscope is located _____.
- a. at the base
 - b. between the coarse and fine adjustments
 - c. in the eyepiece
 - d. beneath the stage
 - e. within the body tube
56. Which microscope plots an absorption spectrum of the item under examination?
- a. polarizing
 - b. compound
 - c. stereoscopic
 - d. microspectrophotometer
 - e. comparison

57. _____ are used to focus the SEM (scanning electron microscope).
- a. Lenses
 - b. Polarizers
 - c. Analyzers
 - d. Magnets
 - e. Diffraction gratings
58. A type of image that cannot be viewed directly is called a(n) _____ image.
- a. imaginary
 - b. illusory
 - c. reflected
 - d. real
 - e. virtual
59. Crystals that are _____ produce two planes of polarized light, each perpendicular to the other.
- a. colored
 - b. isotropic
 - c. solid
 - d. birefringent
 - e. amorphous
60. The pattern and intensity of dependency on a drug does not depend on the _____.
- a. bioavailability of the active metabolite
 - b. cost of the drug
 - c. individual's rate of metabolism
 - d. frequency of administration
 - e. dose and route of administration
61. Which substance is NOT normally used as a diluent of heroin?
- a. glucose
 - b. quinine
 - c. procaine
 - d. starch
 - e. mannitol

62. The administration of which drug eliminates an addict's desire for heroin?
- a. methadone
 - b. morphine
 - c. OxyContin
 - d. methamphetamine
 - e. codeine
63. "Designer" drugs are _____.
- a. often abused by the wealthy
 - b. only available in "boutique" pharmacies and drug stores
 - c. high-end products of the major pharmaceutical companies
 - d. chemically related to controlled substances
 - e. very often used in the fashion industry
64. There is a significant likelihood that continued use of _____ will result in a high degree of psychological dependence.
- a. cocaine
 - b. amphetamines
 - c. heroin
 - d. marijuana
 - e. All of the above.
65. Heroin is a chemical derivative of _____.
- a. morphine
 - b. codeine
 - c. amphetamine
 - d. barbituric acid
 - e. methadone
66. Which of the following statements is FALSE?
- a. The active ingredient of marijuana is tetrahydrocannabinol.
 - b. Marijuana is synthesized from the Cannabis sinsemilla plant.
 - c. Marijuana can tentatively be identified by the Duquenois-Levine color test.
 - d. Prior to 1970 marijuana was classified as a narcotic drug.
 - e. Hashish is a concentrated preparation of marijuana.

67. In Western countries, the most heavily abused drug(s) is/are _____.
- a. tranquilizers
 - b. barbiturates
 - c. amphetamines
 - d. alcohol
 - e. cocaine
68. Field sobriety tests do NOT include _____.
- a. walk and turn
 - b. divided-attention tasks
 - c. horizontal-gaze nystagmus
 - d. one-leg stand
 - e. performance of sit ups
69. Analyzing segments of hair for drug content may define the timeline for drug use, dating it back over a period of _____.
- a. months
 - b. years
 - c. weeks
 - d. All of the above.
70. The Reinsch test would NOT be used to detect _____.
- a. bismuth
 - b. lead
 - c. arsenic
 - d. mercury
 - e. copper
71. Carbon monoxide is toxic because it _____.
- a. destroys red blood cells
 - b. causes platelets to clump
 - c. causes brain damage due to overexposure to carbon atoms
 - d. combines with hemoglobin to form carboxyhemoglobin
 - e. activates killer white blood cells

72. The blood alcohol concentration level for being legally “under the influence” in most states is _____ percent.
- a. 0.04
 - b. 0.15
 - c. 0.05
 - d. 0.10
 - e. 0.08
73. In routine blood banking, which antigen(s) must be determined in testing for compatibility?
- a. a
 - b. b
 - c. d
 - d. All of the above.
 - e. None of the above.
74. Buccal cells are obtained from _____.
- a. blood
 - b. urine
 - c. fingers
 - d. the mouth and inside of the cheek
 - e. semen
75. The presence or absence of how many antigens determines an individual's blood type in the A-B-O system?
- a. 0
 - b. 4
 - c. 2
 - d. 3
 - e. 1
76. Which of the following statements is FALSE?
- a. All blood contains the enzyme peroxidase.
 - b. Dried bloodstains may tentatively be identified as blood by a peroxidase test.
 - c. The bonding of an antigen with its specific antibody causes agglutination.
 - d. A-B-O antigens are present in all human blood.
 - e. The Kastle-Meyer test is used to determine whether blood is of human origin.

77. The clumping together of red blood cells by the action of an antibody is known as _____.
- a. blood typing
 - b. radioimmunology
 - c. serology
 - d. agglutination
 - e. clotting
78. The specific proteins produced by a cell are directly related to the _____.
- a. sequence of nucleotides in the DNA of the cell
 - b. size of the cell
 - c. sequence of sugars and phosphates in the cell
 - d. length of the chromosomes
 - e. number of mitochondria in the cell
79. What is the number of nitrogenous bases needed to code for a specific amino acid?
- a. 5
 - b. 4
 - c. 2
 - d. 3
 - e. 6
80. The discriminating power of mtDNA is _____ the discriminating power of STR analysis.
- a. the same as
 - b. less than
 - c. greater than
81. The intersection of straight lines through the long axis of several individual bloodstains in an impact spatter pattern illustrates the _____ of the pattern.
- a. area of convergence
 - b. drying time
 - c. velocity classification
 - d. void pattern
 - e. area of origin

82. When an object with blood on it touches one that does not have blood on it, this produces a(n) _____.
a. trail pattern
b. contact pattern
c. flow
d. indistinguishable pattern
e. void
83. Proper location and documentation of bloodstain patterns at the crime scene is the responsibility of _____.
a. criminalists and specialists
b. a bloodstain analysis specialist
c. all crime scene personnel
d. the first responding officer
e. the lead investigator
84. Nuclear DNA typing can be most successfully accomplished on hairs that have been removed during which stage of growth?
a. anagenic
b. anxiogenic
c. mutagenic
d. catagenic
e. telogenic
85. Which type of crime is LEAST likely to be solved with the use of fiber evidence?
a. kidnapping
b. breaking and entering
c. sexual assault
d. bombing
e. hit-and-run
86. In the collection of fiber evidence, great care should be taken to _____.
a. vacuum each item for trace evidence
b. shake off all garments to be sent for examination before neatly folding them
c. send as much potential evidence as possible to the crime lab to ensure that nothing is missed
d. package all items from each individual together in one bag to avoid later confusion
e. avoid cross-contamination of evidence

87. Which of the following properties should NOT be examined when comparing two synthetic fibers?
- a. presence or absence of delustering particles
 - b. diameter
 - c. medullary index
 - d. lengthwise striations
 - e. All of the above.
88. The fingerprint classification system used in most English speaking countries was devised by _____.
- a. Vucetich
 - b. Fauld
 - c. Herschel
 - d. Henry
 - e. Galton
89. The pores of the sweat glands are located in the _____.
- a. knuckles
 - b. dermal papillae
 - c. skin ridges
 - d. dermis
 - e. friction grooves
90. The number of deltas found in an arch pattern is _____ the number of deltas found in a loop pattern.
- a. the same as
 - b. greater than
 - c. less than
91. AFIS is a(n) _____.
- a. computerized system for storing and retrieving fingerprint records
 - b. computer system programmed to analyze hair
 - c. assay technique used to identify drugs
 - d. computer software designed to track fingerprint evidence within the chain of custody
 - e. method used to determine age of a latent print

92. Computerized fingerprint search systems match prints by comparing the position of _____ and _____.
- a. bifurcations; ridge endings
 - b. loops; arches
 - c. minutiae; ridge characteristics
 - d. ridges; furrows
 - e. bifurcations; deltas
93. Chokes are sometimes found on shotguns where they function to constrict the end of the barrel. The speed and distance traveled by pellets fired from a narrow choke is _____ the speed and distance traveled by pellets fired from a shotgun with a wide choke.
- a. less than
 - b. the same as
 - c. greater than
94. When an etching agent is applied to a metal surface in order to restore a removed serial number the stamped area will dissolve at _____ rate as the unstamped area.
- a. the same
 - b. a slower
 - c. a greater
95. Which is NOT a class characteristic of a suspect's sneaker?
- a. wear marks
 - b. size
 - c. color
 - d. style
 - e. brand
96. Which of the following is NOT considered a hardware device?
- a. the operating system
 - b. the random access memory
 - c. the hard disk drive
 - d. the monitor
 - e. the mouse

97. Which of the following is NOT considered a type of software?

- a. Linux
- b. Firefox
- c. Unix
- d. Excel
- e. random access memory

98. A software algorithm used to create a “fingerprint” of a file or an entire HDD is called _____.

- a. MD5
- b. MAC OS
- c. RAM
- d. ROM
- e. CPU

99. What keeps track of the location of files and folders on the HDD?

- a. the HDD itself
- b. the search engine
- c. the CD-ROM
- d. the FAT
- e. the CPU

100. A directory or index cataloging the content of the Internet is called _____.

- a. the world wide web
- b. an IPO
- c. a search engine
- d. a web browser
- e. a chat room

