|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. In childhood, bones are built at a faster rate than the rate at which they break down. However, after age 30, the process begins to reverse; bones lose minerals and break down faster than they are built. Some aging people, with especially low bone density, are at risk for:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | osteosclerosis. | b.  | osteoporosis. |
|   | c.  | ossification. | d.  | None of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2. What protects our vital organs?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | epiphysis | b.  | ligaments |
|   | c.  | cartilage | d.  | joints |
|   | e.  | ​diaphysis | f.  | ​bones |
|   | g.  | ​red marrow | h.  | ​All of the above. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. After all bones have become fully developed, an adult has 206 bones.  A baby has:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | 306 bones. | b.  | 370 bones. |
|   | c.  | 206 bones. | d.  | 270 bones. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4. A joint is the location where bones meet.  Joints contain several kinds of connective tissue.  These include:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | cartilage. | b.  | ligaments. |
|   | c.  | tendons. | d.  | All of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5. Which suture(s) on a skull begin(s) closing after age 60?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | coronal suture | b.  | sagittal suture |
|   | c.  | squamosal suture | d.  | sacral suture |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6. Which method is especially helpful for skeletal analysis when identification is impossible due to burns or decomposition?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | non-imaged records comparison | b.  | comparative radiography |
|   | c.  | craniofacial reconstruction | d.  | video superimposition |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7. Although ossification begins before birth, for some bones, ossification can take more than:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | 20 years. | b.  | 30 years. |
|   | c.  | 40 years. | d.  | 50 years. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8. Forensic anthropologists test bones for the presence of different isotopes of carbon and strontium to provide clues as to where a person lived and how long they lived in that area. Strontium is an element found in dissolved groundwater. Stable isotopes of carbon are found in food. Which stable isotopes of carbon were used to do an analysis of the skeletal remains of the Jamestown colonist mentioned in the text?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | carbon-10 and carbon-11 | b.  | carbon-11 and carbon-12 |
|   | c.  | carbon-12 and carbon-13 | d.  | carbon-13 and carbon-14 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9. Determination of ancestry from skeletal remains is difficult. Ancestry is probably best indicated by:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | the bones of the skull. | b.  | the shape of the molars. |
|   | c.  | the surface of the pelvis. | d.  | the ratio of the humerus to the femur. |

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|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10. The main suture mark(s) on a skull, marking where the bones are growing together, are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | the lambdoidal. | b.  | the sagittal. |
|   | c.  | the coronal. | d.  | All of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11. To distinguish between the male and female pelvis, the sub pubic angle is:

|  |  |  |
| --- | --- | --- |
|   | a.  | greater than ninety degrees on the female and less than ninety degrees on the male. |
|   | b.  | less than ninety degrees on the female and greater than ninety degrees on the male. |
|   | c.  | greater than ninety degrees on both the male and the female. |
|   | d.  | None of these choices. |

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|  |
| 12. Nuclear DNA can be extracted from bones and teeth to determine personal identification. If, however, the nuclear DNA is degraded or damaged, there is another substance which is more plentiful and durable that can be analyzed. What is the name of this substance?

|  |  |  |
| --- | --- | --- |
|   | a.  | mitochondrial DNA |
|   | b.  | STR DNA |
|   | c.  | ischium DNA |
|   | d.  | red blood cell DNA |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13. Bones contain a diary of injuries, diseases, and nutritional deficiencies. What would the bones of the women who, in the 1920s, painted watch dials to make them glow in the dark have revealed about the materials they worked with?

|  |  |  |
| --- | --- | --- |
|   | a.  | The paint they used was a derivative of cows' milk and therefore they had excessive calcium in their bones. |
|   | b.  | They needed to work in near darkness all day long and consequently had rickets caused by a lack of vitamin D. |
|   | c.  | As they used radium on the watch dials, their bones absorbed radioactive radium. |
|   | d.  | All of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14. Bone ossification can indicate the age of the victim. What is the approximate age that the femur head is fused to the shaft?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | 4-6 | b.  | 10-12 |
|   | c.  | 16-18 | d.  | ​22-30 |
|  |  |  |  |  |

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15. Punctures resulting from sharp-force trauma, blunt-force trauma and gunshot wounds all have distinctive patterns. Blunt objects generally create which type of injury?

|  |  |  |
| --- | --- | --- |
|   | a.  | more cracks radiating from the site of the impact, and more damage to the surface of the bone |
|   | b.  | fewer cracks radiating from the site of the impact, and more damage to the surface of the bone |
|   | c.  | more cracks radiating from the site of the impact, and less damage to the surface of the bone |
|   | d.  | fewer cracks radiating from the site of the impact, and less damage to the surface of the bone |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16. A man with a heart condition is attacked and dies from a heart attack during the attack.  In this case, the manner of death is:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | accident. | b.  | homicide. |
|   | c.  | natural death. | d.  | suicide. |

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|  |
| 17. An elderly woman dies after being kept from receiving proper health care by her children.   The manner of her death would be:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | accident. | b.  | suicide. |
|   | c.  | natural death. | d.  | homicide. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 18. The reason someone dies is called the:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | manner of death | b.  | cause of death. |
|   | c.  | type of death. | d.  | None of these choices. |

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|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19. The underlying cause of death is called the:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | cause of death. | b.  | proximate cause of death. |
|   | c.  | manner of death. | d.  | None of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20. The specific change in the body that brought about the cessation of life is called the:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | manner of death. | b.  | cause of death. |
|   | c.  | mechanism of death. | d.  | proximate cause of death. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21. Liver mortis means roughly, the:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | moment of death. | b.  | day of death. |
|   | c.  | death color. | d.  | time of death. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 22. Pooling of blood in the body, known as lividity, provides a clue as to how long the person has been dead.  Lividity first begins about:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | two hours after death. | b.  | four hours after death. |
|   | c.  | six hours after death. | d.  | eight hours after death. |

 |
|  |
| 23. Dual lividity could occur if the body was kept in one position:

|  |  |  |
| --- | --- | --- |
|   | a.  | two hours after death, and then moved to a second position before the lividity became permanent. |
|   | b.  | ten hours after death, and then moved to a second position before the lividity became permanent. |
|   | c.  | nine hours after death, and then moved to a second position before the lividity became permanent. |
|   | d.  | None of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24. Death stiffness is roughly defined as:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | cause of death. | b.  | manner of death. |
|   | c.  | rigor mortis. | d.  | liver mortis. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25. Rigor mortis is:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | permanent. | b.  | one cause of death. |
|   | c.  | temporary. | d.  | one manner of death. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26. If a body shows no visible rigor, it has probably been dead:

|  |  |  |
| --- | --- | --- |
|   | a.  | less than two hours or more than forty-eight hours. |
|   | b.  | less than ten hours or more than seventy-two hours. |
|   | c.  | less than twenty-four hours or more than seventy-two hours. |
|   | d.  | more than two hours or less than forty-eight hours. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27. Factors affecting rigor include:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | temperature. | b.  | activity before death. |
|   | c.  | body weight. | d.  | All of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28. Algor mortis means roughly:

|  |  |  |
| --- | --- | --- |
|   | a.  | death heat and describes the temperature gain in a corpse. |
|   | b.  | death heat and describes the temperature loss in a corpse. |
|   | c.  | death chill and describes the temperature loss in a corpse. |
|   | d.  | None of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29. To take a corpse’s temperature, forensic investigators insert a thermometer into the:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | into the liver or rectum. | b.  | into the stomach or mouth. |
|   | c.  | between the toes. | d.  | under or behind the ear. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30. Medical examiners help determine the time of death by studying the stomach contents.  In general, it takes:

|  |  |  |
| --- | --- | --- |
|   | a.  | six to eight hours for the stomach to empty its contents into the small intestine and another twelve hours for the food to leave the small intestine. |
|   | b.  | four to six hours for the stomach to empty its contents into the small intestine and another eighteen hours for the food to leave the small intestine. |
|   | c.  | four to six hours for the stomach to empty its contents into the small intestine and another twelve hours for the food to leave the small intestine. |
|   | d.  | None of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31. In 1855, an entomologist used the concept of insect succession to determine which of four different tenants had murdered an infant that was found within the walls of a house. What was the name of this entomologist? ​

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | ​Dr. Lee Goff | b.  | ​Bergeret d'Arbois |
|   | c.  | ​Dr. David Hall | d.  | ​Jean Pierre Megnin |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 32. ​On a decomposed body, the feeding larvae may have human tissue stored in their crops that can be analyzed to determine:

|  |  |  |
| --- | --- | --- |
|   | a.  | ​whether the body was moved after death. |
|   | b.  | ​whether the deceased was exposed to either toxic chemicals or recreational drugs. |
|   | c.  | ​whether the body was covered, buried, or submerged in water. |
|   | d.  | ​whether the deceased was restrained while alive. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 33. ​Blowflies, also known as carrion flies or bottle flies, include:

|  |  |  |
| --- | --- | --- |
|   | a.  | ​blue bottles, yellow bottles, and silver bottles. |
|   | b.  | ​brown bottles, green bottles, and bronze bottles. |
|   | c.  | ​blue bottles, green bottles, and bronze bottles. |
|   | d.  | ​blue bottles, green bottles, and silver bottles. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 34. ​Within minutes of death, odor emitted from a dead body can be detected by blow flies from:

|  |  |  |
| --- | --- | --- |
|   | a.  | ​a mile away. |
|   | b.  | ​a half-mile away. |
|   | c.  | ​a quarter-mile away. |
|   | d.  | ​a 50-yard radius. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 35. The blowfly lifecycle has six stages. How many larval stages are included in these six stages? ​

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | ​1 | b.  | ​2 |
|   | c.  | ​3 | d.  | ​4 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 36. Blowfly eggs usually hatch in less than: ​

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | ​12 hours. | b.  | ​24 hours. |
|   | c.  | ​36 hours. | d.  | ​48 hours. |

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| 37. ​Flesh flies:

|  |  |  |
| --- | --- | --- |
|   | a.  | ​arrive within minutes of death and feed on the sweat, blood, urine, and feces of the body. |
|   | b.  | ​arrive within minutes of death and lay eggs on the body. |
|   | c.  | ​arrive within minutes of death and deposit living larvae onto the flesh. |
|   | d.  | ​All of the above. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 38. ​The arrival of which type of beetle is associated with the advanced stage of a dead body?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | ​sexton beetle | b.  | ​American carrion beetle |
|   | c.  | ​hide beetle | d.  | ​harry rove beetle |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 39. Coffin flies are: ​

|  |  |  |
| --- | --- | --- |
|   | a.  | ​about the size of fruit flies. |
|   | b.  | ​most likely to appear if the victim is concealed or wrapped in plastic or blankets. |
|   | c.  | ​an indication that a body was left in a car for several days. |
|   | d.  | ​All of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 40. In order to provide the most accurate estimate of postmortem intervals at a crime scene, which type of larvae should be collected? ​

|  |  |  |
| --- | --- | --- |
|   | a.  | ​the oldest larvae |
|   | b.  | ​the youngest larvae |
|   | c.  | ​larvae on internal organs |
|   | d.  | ​larvae on arms, legs, and head and neck |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 41. How do the temperatures of feeding maggot masses compare to ambient temperatures? ​

|  |  |  |
| --- | --- | --- |
|   | a.  | ​They have temperatures of 5°F to 20°F higher than ambient temperature. |
|   | b.  | ​They have temperatures of 5°F to 20°F lower than ambient temperature. |
|   | c.  | ​They have temperatures of 15°F to 30°F higher than ambient temperature. |
|   | d.  | ​They have temperatures of 15°F to 30°F lower than ambient temperature.   |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 42. Environmental conditions affect the growth of larvae. Consequently, in the collection of meteorological data, it is suggested that rainfall amounts be recorded for a period of: ​

|  |  |  |
| --- | --- | --- |
|   | a.  | ​2-3 weeks before the victim's disappearance and 3 to 5 hours after the body was discovered. |
|   | b.  | ​2-3 days before the victim's disappearance and 3 to 5 days after the body was discovered. |
|   | c.  | ​1-2 days before the victim's disappearance and 3 to 5 days after the body was discovered. |
|   | d.  | ​1-2 weeks before the victim's disappearance and 3 to 5 days after the body was discovered. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 43. ​The number of hours at an adjusted average temperature, using Celsius degrees, that it takes an insect species to reach a particular stage of development is expressed in:

|  |  |  |
| --- | --- | --- |
|   | a.  | ​annual degree hours. |
|   | b.  | ​adjusted degree hours. |
|   | c.  | ​average degree hours. |
|   | d.  | ​accumulated degree hours. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 44. The lower limit threshold is the temperature below which growth and development cease for an insect. For most insects, what temperature represents their lower limit threshold? ​

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | ​10°C | b.  | ​15°C |
|   | c.  | ​20°C | d.  | ​25°C |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 45. ​One type of insect typically arrives within minutes after death. Therefore, this type of insect is considered to be timekeepers for postmortem intervals. Which type of insect is this?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | ​sexton beetle | b.  | ​flesh flies |
|   | c.  | ​blowflies | d.  | ​houseflies |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 46. Americans write more than 70 billion checks a year. What is the approximate value of illegitimate checks that are cashed each day?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | $87 million | b.  | $67 million |
|   | c.  | $47 million | d.  | $27 million |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 47. Initial comparisons of documents are done with:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | the naked eye. | b.  | a hand-held lens. |
|   | c.  | a microscope. | d.  | All of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 48. When a material gain, such as money, accompanies a forgery, it is called:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | a monetary gain. | b.  | fraudulence. |
|   | c.  | battery. | d.  | deception. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 49. Criminals can alter or acquire checks in many ways, including:

|  |  |  |
| --- | --- | --- |
|   | a.  | ordering someone else’s checks from a deposit slip. |
|   | b.  | directly altering a check. |
|   | c.  | intercepting someone’s check, altering it and cashing it. |
|   | d.  | All of these choices. |

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| 50. Literary forgery refers to the forgery of a:

|  |  |  |
| --- | --- | --- |
|   | a.  | piece of writing, such as an historic letter or a manuscript. |
|   | b.  | signature. |
|   | c.  | piece of art. |
|   | d.  | None of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 51. Documents are sometimes chemically treated to make them look:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | younger. | b.  | older. |
|   | c.  | more authentic. | d.  | foreign. |

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| 52. When currency or other items are copied for the purpose of deception and profit, it is called:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | forgery. | b.  | fraud. |
|   | c.  | ​counterfeiting. | d.  | scamming. |
|   | e.  | ​All of these choices. | f.  | None of these choices. |

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| 53. Counterfeiting-detecting pens are inexpensive special pens and markers containing the element:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | iodine. | b.  | mercurochrome. |
|   | c.  | invisible ink. | d.  | None of these choices. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 54. Pen manufacturers claim the counterfeiting-detecting pen is:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | 50 percent effective. | b.  | 75 percent effective. |
|   | c.  | 98 percent effective. | d.  | 100 percent effective. |

 |
| 55. The study of graphology is:

|  |  |  |
| --- | --- | --- |
|   | a.  | not necessarily accepted as part of forensic science, but it can be used as a possible indicator of the writer’s personality type. |
|   | b.  | accepted as part of forensic science, but it can be used as a possible indicator of the writer’s personality type. |
|   | c.  | not necessarily accepted as part of forensic science, but it can be used to determine identity. |
|   | d.  | None of these choices. |

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| 56. Although poisoning is popular in murder mysteries and detective stories, it is:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | a common form of murder. | b.  | not a common form of murder. |
|   | c.  | a common form of suicide. | d.  | a common form of manslaughter. |

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| 57. Bulgarian dissident Georgi Markov was killed in 1978 by:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | ricin. | b.  | radiation. |
|   | c.  | cyanide. | d.  | arsenic. |

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| 58. In 2014, what damaged the drinking water for 300,000 West Virginia residents?

|  |  |  |
| --- | --- | --- |
|   | a.  | high levels of arsenic |
|   | b.  | a release of heavy metals into the water supply |
|   | c.  | PCP contamination of the water by a disgruntled employee of the water department |
|   | d.  | a spill of MCHM, a chemical used to wash coal, into the water supply |

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| 59. There is a drug which is frequently made in home laboratories. As the chemicals used in the production of the drug are very dangerous, there are frequently explosions that occur during production. The name of this drug is:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | depressants ("downers"). | b.  | synthetic marijuana ("spice"). |
|   | c.  | PCP ("angel dust"). | d.  | methamphetamines ("meth"). |
|   | e.  | ​All of these choices. |  |  |

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| 60. Controlled substances are defined as:

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| --- | --- | --- |
|   | a.  | illegal drugs whose sale, possession, and use are prohibited because of the mind-altering effect of the drugs and the potential for abuse. |
|   | b.  | legal drugs whose sale, possession, and use are restricted because of the mind-altering effect of the drugs and the potential for abuse. |
|   | c.  | legal drugs whose sale, possession, and use are permitted. |
|   | d.  | None of these choices. |

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61. Acute poisoning is due to:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | a high dose over a short period of time. | b.  | a low dose over a long period of time. |
|   | c.  | a low dose over a short period of time. | d.  | None of these choices. |

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| 62. Arrests for drug abuse violations have been:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | increasing steadily since the early 1990s. | b.  | decreasing steadily since the early 1990s. |
|   | c.  | the same since the early 1990s. | d.  | None of these choices. |

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| 63. Hallucinogens are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | never derived from plants. | b.  | rarely derived from plants. |
|   | c.  | often derived from plants. | d.  | always derived from plants. |

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| 64. If a liquor contains 40 percent of alcohol, what proof is it?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | 20 proof | b.  | 40 proof |
|   | c.  | 60 proof | d.  | 80 proof |

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| 65. Which techniques may be used in presumptive testing?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | colorimetric testing | b.  | microcrystalline testing |
|   | c.  | gas chromatography-mass spectrometry | d.  | microscopic examination of plant matter |
|   | e.  | ​All of the above |  |  |

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| 66. Narcotics act as:

|  |  |  |
| --- | --- | --- |
|   | a.  | depressants and suppress pain. |
|   | b.  | stimulants and heighten pleasure. |
|   | c.  | mood enhancing substances that flood the brain with dopamine. |
|   | d.  | None of these choices. |

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| 67. Stimulants:

|  |  |  |
| --- | --- | --- |
|   | a.  | increase feelings of energy and alertness, while suppressing appetite. |
|   | b.  | decrease feelings of energy and alertness, while suppressing appetite. |
|   | c.  | increase feelings of energy and alertness, while increasing appetite. |
|   | d.  | increase feelings of lethargy and alertness, while increasing appetite. |

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| 68. Anabolic steroids:

|  |  |  |
| --- | --- | --- |
|   | a.  | decrease cell and tissue growth and division. |
|   | b.  | promote cell and tissue growth and division. |
|   | c.  | promote cell growth and decrease tissue growth and division. |
|   | d.  | decrease cell growth and increase tissue growth and division. |

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| 69. According to the National Institute on Drug Abuse 2013 survey, how much is spent annually in workplace costs because of drug abuse?

|  |  |  |
| --- | --- | --- |
|   | a.  | more than $400 billion |
|   | b.  | more than $500 billion |
|   | c.  | more than $600 billion |
|   | d.  | more than $700 billion |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 70. What substance causes death by affecting the heart's ability to send electrical signals?

|  |  |  |
| --- | --- | --- |
|   | a.  | sodium pentothal |
|   | b.  | potassium chloride |
|   | c.  | arsenic |
|   | d.  | mercury |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 71.  Red blood cells:

|  |  |  |
| --- | --- | --- |
|   | a.  | carry respiratory gases, mainly oxygen and carbon dioxide. |
|   | b.  | fight disease and foreign invaders. |
|   | c.  | aid in blood clotting. |
|   | d.  | are involved in repairing damaged blood cells. |

 |
| 72. White blood cells secrete proteins:

|  |  |  |
| --- | --- | --- |
|   | a.  | known as antibodies, which assist in the immune response. |
|   | b.  | known as viruses, which assist in the immune response. |
|   | c.  | known as bacteria, which assist in the immune response. |
|   | d.  | known as parasites, which assist in the immune response. |

73. The immune system functions to protect our bodies by identifying cells or molecules that are foreign, such as:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | viruses. | b.  | bacteria. |
|   | c.  | parasites. | d.  | All of these choices. |

 |
| 74. The three components of blood, red blood cells, white blood cells, and platelets, are carried throughout the body in:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | antibodies. | b.  | plasma. |
|   | c.  | basophil. | d.  | monocytes. |

 |
| 75. Blood typing is less expensive and quicker for analyzing blood evidence than DNA profiling.  Since many different people share the same type, this blood evidence is considered to be:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | individual evidence. | b.  | class evidence. |
|   | c.  | trace evidence. | d.  | biological evidence. |

76. The presence or absence of particular proteins, found embedded within a cell or plasma membranes of red blood cells, determines a person’s:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | DNA. | b.  | blood type. |
|   | c.  | Rh factor. | d.  | surface proteins. |

 |
| 77. In 1900, Karl Landsteiner found that the blood from one person:

|  |  |  |
| --- | --- | --- |
|   | a.  | did not always freely mix with blood from another person. |
|   | b.  | always freely mixes with blood from another person. |
|   | c.  | always freely mixes with blood from another group of persons. |
|   | d.  | None of these choices. |

 |
|  |
| 78. Each blood type is determined by:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | a DNA reaction test. | b.  | an antibody reaction test. |
|   | c.  | a protein reaction test. | d.  | a RF factor reaction test. |

 |
| 79. A and B proteins are found on the surface of some red blood cells.  If a person’s blood contains both the A and the B proteins, then he or she has:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | type A blood. | b.  | type B blood. |
|   | c.  | type AB blood. | d.  | type O blood. |

 |
| 80. Of the four main human blood types using the ABO system, the largest percentage of the U.S. population is made up of:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | Type O. | b.  | Type A. |
|   | c.  | Type B. | d.  | Type AB. |

 |
| 81. What term describes the clumping of red blood cells?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | agglutination | b.  | antigens |
|   | c.  | eosinophil | d.  | lymphocyte |

 |
| 82. In 1940, Alexander Weiner, working with Rhesus monkeys, noticed another type of red cell protein. This red cell protein, called RH factor, is on the red blood cells of:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | 85 percent of the human population.   | b.  | 75 percent of the human population.   |
|   | c.  | 65 percent of the human population.   | d.  | 55 percent of the human population.   |

83. What happens to the shape of a blood droplet as the angle of release changes from a 90-degree drop toward a 10-degree drop?

|  |  |  |
| --- | --- | --- |
|   | a.  | It becomes wider than its length. |
|   | b.  | It becomes more longer than wide. |
|   | c.  | It becomes more circular. |
|   | d.  | It has more spines. |

 |
| 84. Which type of bloodstain pattern suggests that bloody hair was dragged across the floor?

|  |  |  |
| --- | --- | --- |
|   | a.  | wipe |
|   | b.  | arterial gush |
|   | c.  | swipe |
|   | d.  | transfer pattern |

 |
| 85. Today blood splatter evidence is used to explain events:

|  |  |  |
| --- | --- | --- |
|   | a.  | at all death scenes. |
|   | b.  | at vehicular homicide scenes. |
|   | c.  | during crime-scene analysis.   |
|   | d.  | ​None of these choices. |
|   | e.  | ​All of these choices. |

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|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 86. Except for identical twins, no two people on earth have the same:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | physical characteristics. | b.  | DNA. |
|   | c.  | blood group. | d.  | skeletal type. |

 |
| **87.**People are always shedding cells. Therefore, DNA can be recovered from:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | skin cells. | b.  | saliva. |
|   | c.  | semen. | d.  | a and b only. |
|   | e.  | ​a and c only. | ab.  | a, b, and c. |

 |
| 88. The term that describes a picture of homologous pairs of human chromosomes is:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | karyotype. | b.  | genetics. |
|   | c.  | archetype. | d.  | a and b only. |
|   | e.  | ​All of these choices. | ab.  | None of these choices. |

 |
| 89. The 95 percent of noncoding DNA is involved in:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | blueprint production. | b.  | genetic material. |
|   | c.  | cell regulation. | d.  | DNA fingerprinting. |

 |
| 90. If one person has two alleles that are the same for a specific STR, then that person is considered to have:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | rare occurring alleles. | b.  | heterozygous genotypes. |
|   | c.  | frequently occurring alleles. | d.  | homozygous genotypes. |

 |
| 91. Which chromosomes have the same shape and contain the same genes?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | genes | b.  | autosomes |
|   | c.  | (XX) | d.  | introns |

 |
| 92. DNA in chromosomes is called

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | DNA. | b.  | DNA chromosomes. |
|   | c.  | nuclear DNA. | d.  | structural DNA. |

 |
| 93. Alternate forms of a gene are called:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | chromosomes. | b.  | DNA. |
|   | c.  | alleles. | d.  | RNA. |

 |
| 94 (GAAT) (GAAT) (GAAT) (GAAT) is an example of:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | restriction fragments.  | b.  | DNA fingerprinting. |
|   | c.  | PCR. | d.  | STR. |

 |
| 95. The total amount of DNA in a cell, which is contained in the cell's nucleus (nuclear DNA) and mitochondria (mtDNA), is called the human:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | genome. | b.  | gene. |
|   | c.  | allele. | d.  | RNA. |

 |
| 96. Approximately how many base pairs are in the human body?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | 6 million base pairs. | b.  | 6 billion base pairs. |
|   | c.  | 6 thousand base pairs | d.  | 6 trillion base pairs. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 97. In 1984, Dr. Alec Jeffreys at the University of Leicaster observed that DNA from different individuals contains different polymorphisms.  His laboratory developed a technique for isolating and analyzing these variable areas that is known as:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | DNA quantifying, or DNA profiling. | b.  | DNA fingerprinting, or DNA profiling. |
|   | c.  | DNA sorting, or DNA profiling. | d.  | DNA investigating, or DNA profiling. |

 |
| 98. Which method is used to identify different STR markers?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | x-raying DNA samples | b.  | extracting the mtDNA from the gene |
|   | c.  | adding fluorescent dyes to the PCR reaction | d.  | calculating the allele frequency |

 |
| 99. Ninety-five percent of DNA is non-coding. What term describes non-coding DNA that acts as genetic "on-an-off" switches?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | karotypes | b.  | exons |
|   | c.  | introns | d.  | base pairs |

|  |  |
| --- | --- |
|  |  |

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