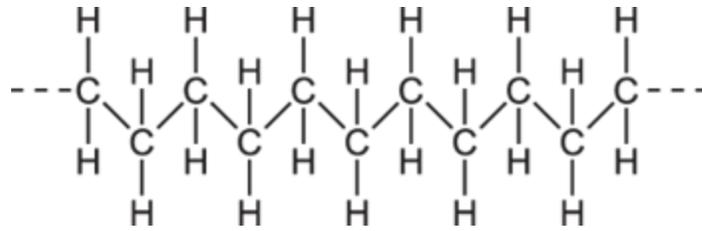


Forensics Key

(General Knowledge)

1. What is the definition of chromatography?
 - a. The separation of mixtures into their constituents
2. What is the difference between a solvent and a solute?
 - a. In a mixture, the solute is the substance that is dissolved into the solvent.
3. What ratio does R_f represent?
 - a. Distance traveled by pigment : Distance traveled by solvent
4. Write the balanced chemical reaction made between Calcium Carbonate and Hydrochloric Acid.
 - a. $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$
5. What protein is hair primarily composed of?
 - a. Keratin
6. How many ridges does the average human adult have on one finger?
 - a. 150
7. What does R_f stand for?
 - a. Retention Factor
8. What causes fingerprint ridge patterns?
 - a. Amount and location of volmer pads in thick skin
9. Name two uses of Calcium Nitrate.
 - a. Any combination (may be more): fertilizer, ice melt, glass manufacture, meat preserve, reagent, catalyst in rubber production, pyrotechnic
10. What is the full name for the polymer abbreviated using the letters LDPE?
 - a. Low Density Polyethylene
11. Draw the chemical structure for LDPE.



12. Please name two uses for LDPE.

- a. Any combination (may be more): addition, bread bags, frozen food bags, grocery bags

13. What is the chemical basis for Iodine fuming (Ninhydrin)?

- a. Iodine reacts with oils/fats, Ninhydrin reacts with amino acids

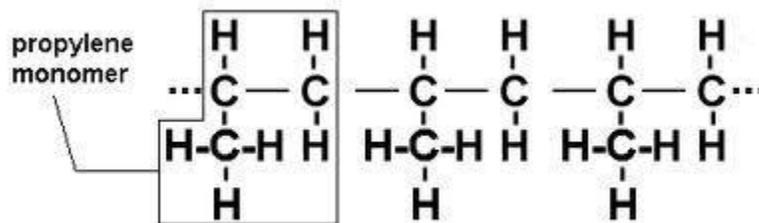
14. What is the chemical basis for dusting (S.P.R.)?

- a. Fatty acids/lipid reaction

15. What is the full name for the polymer abbreviated using the letters PP?

- a. Polypropylene

16. Draw the chemical structure of PP.



17. Please name two uses for PP.

- a. Addition, dishwasher safe containers, yogurt containers, margarine tubs, medicine bottles, bottle tops

18. What does DNA stand for?

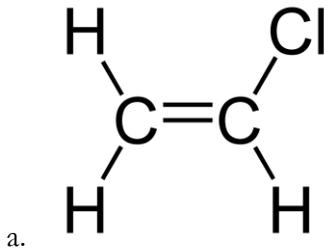
- a. Deoxyribonucleic Acid

19. Name two uses of Lithium Chloride.

- a. Bipolar disorder medication, antidepressants, brazing flux for aluminum in automobile parts

20. What insect is usually the first to come into contact with a dead body?
- Blow-flies
21. Define the meaning of a diatomic element.
- Elements that make a diatomic molecule with only the atoms of their element.
22. Please list all elements that can be diatomic.
- Hydrogen, Nitrogen, Oxygen, Fluorine, Chlorine, Bromine, Iodine
23. What are the four nucleotides found in DNA?
- Adenine, Guanine, Thymine, Cytosine
24. List two names for the chemical powder NaHCO_3 .
- Sodium Bicarbonate and Sodium Hydrogen Carbonate
25. What is the full name for the polymer abbreviated using the letters PVC?
- Polyvinylchloride

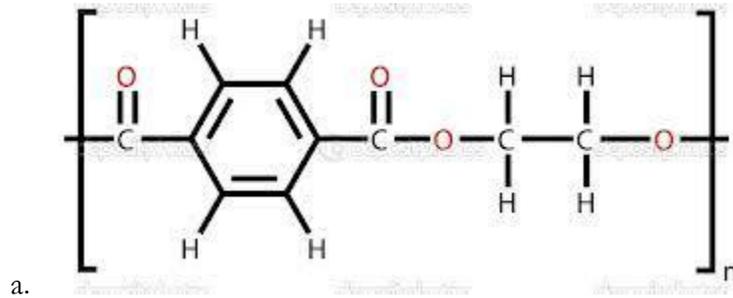
26. Draw the chemical structure of PVC.



27. Please name two uses for PVC.
- package film, unplastered foam, water pipes, plumbing, phonograph records, synthetic floor tiles, credit cards, plastic raincoats, shower curtains
28. What percentage of the population has arched fingertips?
- 5%
29. Describe two uses of Boric Acid.
- Antiseptic, electrophoresis, insecticide, fiberglass manufacturing, pyrotechnics, industrial manufacturing, nuclear power
30. What is the full name for the polymer abbreviated using the letters PETE?

- a. Polyethylene Terephthalate

31. Draw the chemical structure of PETE.



32. Please name two uses for PETE.

- a. Bottles, peanut butter jars, salad dressing bottles, non-breakable bottles

33. What type of molecule is being tested for in ABO blood testing?

- a. Protein

34. What does AFIS stand for?

- a. Automated fingerprint identification system

35. What percentage of the population has looped fingerprints?

- a. 70%

36. What percentage of the population has whorl fingerprints?

- a. 25%

37. How is DNA replicated in a laboratory?

- a. Using a Polymerase Chain Reaction (PCR) sequence

38. What property of the nucleotides makes DNA replication possible?

- a. Adenine only matches to Thymine (and vice versa) and Cytosine only matches to Guanine (and vice versa)

39. What are the four steps of Mass Spectrometry?

- a. Ionisation, Acceleration, Deflection, Detection

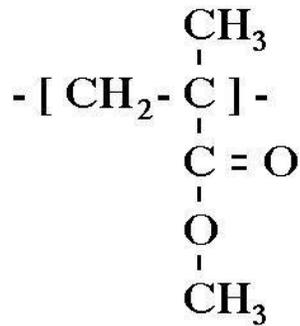
40. What are the two primary categories of fibers?

- a. Natural and Synthetic

41. What is the full name for the polymer abbreviated using the letters PMMA?

a. Poly(methyl methacrylate)

42. Draw the chemical structure of PMMA.



a.

43. Please name two uses for PMMA.

a. Addition, plexiglass, barrier at ice rinks, basketball backboards

44. What is another name for Fourier transform ion cyclotron resonance mass spectrometry?

a. Fourier transform mass spectrometry

45. What does m/z mean in mass spectrometry?

a. mass-to-charge ratio

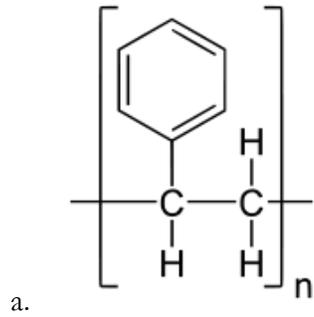
46. Other than in the hair, where can the protein that primarily comprises hair be found in the human body?

a. nails, outermost layer of skin

47. What is the full name for the polymer abbreviated using the letters PS?

a. Polystyrene

48. Draw the chemical structure of PS.



49. Please name two uses for PS.

- a. Addition, disposable cutlery, plastic models, CD + DVD cases, smoke detectors, packaging materials, insulation, foam drink cups

50. Please label the following diagram.

(Only the three blank lines)

