1) How many electrons does a fluorine atom have in total? Nine

2) How many valence electrons does a fluorine atom have? Seven

3) In general, do fluorocarbons compounds occur naturally? No

4-5) Draw a correct Lewis structure (including lone pairs of electrons) for the following species:

4) Fluoride ion

5) Fluorine gas (F₂)

6) Fluorine is the 13th most abundant element, in what form is it mainly found?
CaF₂, mineral fluorspar

7) What does perfluorinated mean?
FULLY FLUORINATED (EVERY C-H IS A C-F)

8) Give one similarity between hydrogen and fluorine.
BOTH UNIVALENT; SMALL; I = ⅔; FORM STRONG BONDS TO C;

9) Give one similarity between chlorine and fluorine.
7 valence e⁻; ELECTRONEGATIVE; LEAVING GROUP

10) How is fluorine produced industrially?
Electrolysis of HF (HF, KF as electrolyte in HF)

11) Fluorine gas is very reactive, and is thus available commercially as a mixture (usually 1-3%) diluted with an inert gas. Name one of those inert gases used.

He or N₂
12-14) Circle the molecule with the stronger $\sigma$ bond:

12) $\text{CF}_4$  $\text{CCl}_4$
13) F-F  Cl-Cl
14) $\text{CF}_4$  $\text{CH}_4$

15) Which chemist first isolated Fluorine?

Henri Moissan

16-17) Draw a correct Lewis structure for:

18-20) What are the three characteristics that make fluorine such a special and unique substituent?

- Next smallest substituent after Hydrogen
- Most electronegative element
- Can form a bond to Carbon that is stronger than a C-H bond.