





2. (20 marks in total) For *two out of three* of the following parts, give an answer in the space provided. **Clearly show which ones you want me to grade by circling its letter.** Show your reasoning and/or your work.

a) Describe what Ozone is and why it is sometimes good for us and sometimes bad for us.

b) Calculate the molecular weight and %C, %H, and %F for CHF<sub>3</sub>.

c) Define what beta and gamma radiation are. Which is normally more dangerous and why?

3. (20 marks in total) Clearly describe:

(a) The parts of an X-ray diffractometer and the purpose of each (use diagrams).

(b) The steps used to go from a single crystal to a picture of the molecule by diffraction methods.

4. (20 marks in total) For *two out of three* of the following parts, give an answer in the space provided. **Clearly show which ones you want me to grade by circling its letter.** Show your reasoning and/or your work.

(a) Using words *and pictures*, clearly describe the structure of a  $^{19}\text{F}$  atom and its nucleus.

(b) What is meant by the greenhouse effect? Clearly describe the roles of Chlorofluorocarbons in the greenhouse effect.

(c) Clearly describe what thermoelectric power generation is, include its advantages and disadvantages.

5. (20 points maximum) For **one out of two** of the following parts, give an answer in the space provided. **Clearly show which ones you want me to grade by circling its letter.** Show your reasoning and/or your work.

(a) Describe in detail the process by which a solid object burns. Include in your description a discussion of how this is related to three ways a material can be made less flammable.

Or

(b) Clearly describe the process by which crude oil is converted into gasoline in a modern refinery.