Introduction to Biochemistry

What is the difference between an inorganic and organic compound?

**ORGANIC** compounds contain the elements **CARBON** and **HYDROGEN**.
- Examples of organic compounds are:
  - \(-\text{CH}_4\) (methane)
  - \(-\text{C}_6\text{H}_12\text{O}_6\) (simple sugar – glucose)

**INORGANIC** compounds contain any combination of elements including carbon **OR** hydrogen
- Examples of inorganic compounds are:
  - \(-\text{H}_2\text{O}\) (water)
  - \(-\text{CO}_2\) (carbon dioxide)
  - \(-\text{SO}_2\) (sulfur dioxide)

What four elements are found in all living organisms?
- Carbon (C)
- Hydrogen (H)
- Oxygen (O)
- Nitrogen (N)

Other elements are found in the body in **trace** amounts include:
- Iron
- Calcium
- Sulfur
- Potassium
- Magnesium
- Phosphorus
- Chlorine
- Sodium

What are the four major groups of organic compounds found in all living organisms?
- **Carbohydrates**: sugars and starches
- **Lipids**: fats, oils and waxes
- **Proteins**
- **Nucleic Acids**: DNA and RNA

**Carbohydrates**: (sugars and starches)
- Building blocks are repeating units of **simple sugars like glucose**
- Glucose is used as an **immediate source of energy** by most living organisms
- Extra sugar as starches (lots of simple sugars linked in a chain)
Lipids: fats, waxes, and oils
✓ Building blocks are fatty acids and glycerol
✓ Used as a reserve energy source by most living organisms
✓ Lipids also make up parts of the cell including the cell membrane

Proteins:
✓ Building blocks are repeating units of amino acids
✓ There are four major functions of proteins in living things:
  -- hormones are chemical messengers that help to regulate life processes
  -- structural body parts such as hair, nails, part of cell membranes
  -- pigments such as hemoglobin and chlorophyll
  -- enzymes which control the rate of chemical reactions (also known as organic catalysts)

Nucleic Acids:
✓ Building blocks are repeating units of nucleotides
✓ Include DNA and RNA
✓ Store the hereditary (genetic information) within the chromosomes found in the nuclei of cells.

Please answer the following questions:

1. Inorganic or Organic: Examine the compounds listed below. Write a capital letter O if you think the compound is organic or a capital I if you think it is inorganic.
   _____NH₃   _____H₂SO₄
   _____C₆H₆   _____CO₂
   _____HCl   _____C₁₂H₂₂O₁₁

2. What are the four most common elements found in living things?

3. For the following trace elements, please write the chemical symbol next to each element (you may need your textbook or reference for this).
   _____Iron
   _____Calcium
   _____Sulfur
   _____Potassium
   _____Magnesium
   _____Phosphorus
   _____Chlorine
   _____Sodium
4. Please fill in the chart below.

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<th>Organic Compound</th>
<th>Building Blocks</th>
<th>Functions in Living Organisms</th>
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