1. (60 p)Describe what kind of health concerns (e.g., acute, chronic, carcinogenic, non-carcinogenic) the following chemical may cause in humans. How can they be removed from raw water (e.g., sedimentation, filtration etc.,?

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Health concern (acute, chronic, carcinogenic, non-carcinogenic** | **Treatment** |
| Nickel (Cd2+) |  |  |
| Calcium (Ca2+) |  |  |
| Copper (Cu2+) |  |  |
| Trihalomethane (THM) |  |  |
| sulfate (SO42-) |  |  |
| Arsenic (V) |  |  |
| Iron (II) |  |  |
| Manganese (II) |  |  |
| Total suspended solids (TSS) |  |  |
| Methane (H2S) |  |  |

1. (40 p) Each of the following chemicals may be used in a municipal water treatment plant. Write down the names/commercial names and state the purpose for which each is used

|  |  |  |
| --- | --- | --- |
| **Chemical** | **Name** | **Purpose** |
| Al2(SO4)3 |  |  |
| Cationic polymer |  |  |
| ClO2 |  |  |
| KMnO4 |  |  |
| NaOCl |  |  |