1- Define: (a) pH; (b) Alkalinity; (c) Mole; (d) Molarity?

2- Use the units conversions to show that the density of 1 g/mL is the same as a density of 1000 kg/m^3 ?

3- What's the concentration of chlorine (in mg/L) of household bleach that contains (a) 3.00 percent by weight of Cl_2 ; (b) 5.25 percent by weight of Cl_2 ? Assume the density of water = 1000 kg/m³?

4- The standard for Arsenic in drinking water is 10 parts per billion (ppb). What's the concentration in mg/L and in parts per million (ppm)?

5- Calculate the molarity (M) =(mole/liter) of the following:

a- 70 mg/L H ₃ PO ₄	b- 100 mg/L Ca(HCO ₃) ₂
c- 150 mg/L H ₂ SO ₄	d- 200 mg/L HCl

6- Convert from mg/L as ions to mg/L as CaCO₃ for the following ions:

a- 27 mg/L Mg ²⁺	b- 83 mg/L Ca ²⁺
c- 220 mg/L HCO ₃	d- 15 mg/L CO_3^{2-}

7- What's the exact alkalinity (in mg/L as $CaCO_3$) of water that contains 0.658 mg/L of bicarbonate as ions at pH of (a) 5.66 and (b) 9.43? Assume that no carbonate in the water.

8- Calculate the approximate - neglect the effect of pH - alkalinity (in mg/L as CaCO₃) of water containing 120 mg/L of bicarbonate ion and 15 mg/L of carbonate ion?

9- A town has a population of 200000 capita, and the current water consumption per capita is 200 L/C/D (liter/capita/day). If the population increases with 1.2% each year. Calculate the annual average consumption, the maximum monthly consumption, the maximum daily consumption, and the maximum hourly consumption after 40 years in m³/day?

10- Estimate the approximate alkalinity in mg/L as $CaCO_3$ of water with a carbonate ion of 17 mg/L and a bicarbonate ion concentration of 111 mg/L. Chose the solution from the following:

I- 119 mg/L as CaCO₃ II- 128 as mg/L as CaCO₃

III- 148 mg/L as CaCO₃ IV- 146 mg/L as CaCO₃