CE 443 Quiz -2 Spring 2007

Name _____

- Write clearly and show all your work to get partial credit
- For each problem work in the units given. Indicate units on your answer.
  Open book, open notebook

1. A 4' by 4' footing is located in fine sand at 3' below ground surface. Water table is at 3' depth. Unit weight of sand is 110lb/ft^3 above water table and 120 lb/ft^3 below water table. Its angle of friction is 35°. For a factor of safety of 2.5, determine the magnitude of safe load for this footing using general bearing capacity equation.

2. A column footing 1.5m by 2.0m carries a vertical load of Q= 500 kN, M_L = 50kN-m, and M_B = 25.kN-m. It is located 0.75 m below ground in a sand with γ = 19 kN/m^3, $\phi = 32^0$ and c = 0. Determine its FS against bearing capacity failure. Use API method and bearing capacity factors from sec.3.6.

3. A 2m by 2m footing carries a load of 2400kN, and is located at 1.5m depth in a sand with average cone penetration resistance of 8MPa. Use Schmertmann-Hartman method as given in class. Compute settlement of the strip footing if its expected life is 30 years. $\gamma_{soil} = 18kN/m^3$ and $\gamma_{concrete} = 24kN/m^3$. Assume footing to be 0.5m thick.