

Review for CTC 450 Midterm

1. Chemistry Principles
 - a. Stoichiometry
 - b. Equivalence
 - c. Mass Concentration
 - d. Solids Calculations (Total Solids, Suspended Solids, Volatile Solids, ppm=mg/l)
2. Biology
 - a. BOD (non-seeded)
3. Fluid Statics
 - a. Fluid Properties (specific weight, viscosity)
 - b. Manometers
 - c. Pressure/Pressure Head (Pressure=Specific Weight*H)
 - d. Buoyancy (Buoyancy=Specific Wt * submerged volume); Weight in Water (buoyancy force already accounted for); Weight in Air
 - e. Resultant Force and Locations:
 - i. Horizontal Plane Surfaces (uniform pressure)
 - ii. Vertical Rectangular Plane Surfaces
 1. Triangular Pressure Distribution (unsubmerged)
 2. Trapezoidal Pressure Distribution (submerged)
 - iii. Inclined/Submerged Plane Surfaces (Gate area, gate centroid, gate moment of inertia about the centroid, h-bar, and y-bar)
 1. Moment of Inertia about the Centroid
 2. Measurements: vertically (h-bar) and along incline (y-bar)
4. Fluid Flow
 - a. Flow Definitions
 - i. Laminar/Turbulent
 - ii. Uniform/Non-Uniform
 - iii. Steady/Non-Steady
 - b. Reynold's Number (Velocity*Diameter/Kinematic Viscosity)
 - c. Continuity Equation ($Q=V*A$)
5. Bernoulli's
 - a. No Friction Loss
 - b. Accounts for Pressure Head, Velocity Head and Potential Energy
 - c. EGL/HGL Graphs
 - d. Identify pts (top of water-large tank or reservoir; just outside pipe emitting to atmosphere)
6. Energy Equation
 - a. In addition to Bernoulli's accounts for Energy Supplied by Pump, Energy Lost due to Turbine and Energy Lost due to Friction (Pipe and Other Head Losses)
 - b. EGL/HGL Graphs
7. Friction Loss
 - a. Darcy-Weisbach/Moody's Diagram
 - b. Hazen-Williams
 - c. Other Head Losses ($K*$ velocity head)