Chapter 1

Specific Weight
\[ \gamma = \rho g \]

Ideal Gas Law
\[ \rho = \frac{p}{RT} \]

Newtonian Fluid Shear Stress
\[ \tau = \mu \frac{du}{dy} \]

Bulk Modulus
\[ E_v = -\frac{dp}{dV/V} \]

Speed of Sound
\[ c = \sqrt{\frac{dp}{d\rho}} \]

Capillary Rise in a Tube
\[ h = \frac{2\sigma \cos \theta}{\gamma R} \]

Chapter 2

Hydrostatic Pressure
\[ \frac{dp}{dz} = -\gamma \]

Force acting a plane surface
\[ F_R = \gamma \sin \theta \int_A y \, dA \]
\[ F_R = \gamma h_c A \]

Effective location of hydrostatic force
\[ y_R = \frac{\int_A y^2 \, dA}{y_c A} \]

Buoyant Force
\[ F_B = \gamma V \]

Chapter 3

Streamwise Acceleration
\[ a_s = V \frac{\partial V}{\partial s}, \quad a_n = \frac{V^2}{R} \]

Bernoulli equation
\[ p + \frac{1}{2} \rho V^2 + \gamma \zeta = \text{constant along streamline} \]

Flow Meter
\[ Q = A_2 \sqrt{\frac{2(p_1 - p_2)}{\rho [1 - (A_2/A_1)^2]}} \]

Sluice Gate
\[ Q = z_2 b \sqrt{\frac{2g(z_1 - z_2)}{1 - (z_2/z_1)^2}} \]
<table>
<thead>
<tr>
<th>Gas</th>
<th>Density</th>
<th>Molecular Weight</th>
<th>Specific Volume</th>
<th>Kinematic Viscosity</th>
<th>Dynamic Viscosity</th>
<th>Kinematic Viscosity</th>
<th>Dynamic Viscosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ozone</td>
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Approximate Physical Properties of Some Common Gases at Standard Atmospheric Pressure (SI Units)

<table>
<thead>
<tr>
<th>Liquid</th>
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<th>Specific Volume</th>
<th>Viscosity</th>
<th>Viscosity</th>
<th>Viscosity</th>
</tr>
</thead>
<tbody>
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<td>Glycolin</td>
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<tr>
<td>Ethyl Alcohol</td>
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</table>

Approximate Physical Properties of Some Common Liquids (SI Units)

TABLE 1.7