CE 3305 Fluid Mechanics
Spring 2014 Quiz 21

1. If a pump having the characteristics shown in Figure 1 has a diameter of 40 cm and is operating at 1000 rpm, what is the anticipated discharge when the added head is 3 meters?

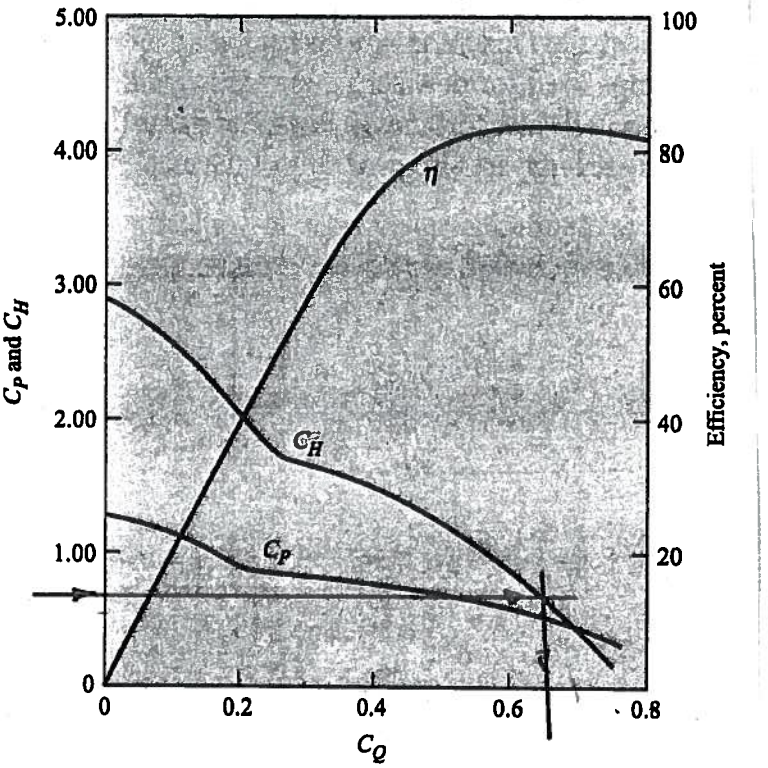

Figure 1: Pump Characteristics

SOLUTION

COMPUTE C_H, ENTER FROM LEFT, RECOVER C_Q

DIMENSIONALIZE TO RECOVER Q

$$C_H = \frac{\Delta H}{D^2 n^2/g} = \frac{3m}{(0.4)^2\left(1000\frac{rev}{min}\frac{1min}{60sec}\right)^2/9.8} = 0.6615$$

$$C_Q \approx 0.65 = \frac{Q}{nD^3}, \quad \text{SOLVE FOR } Q$$

$$Q = \left(\frac{1000}{60}\right)(0.4)^3(0.65) = 0.693\,m^3/s$$