ITP 308: Homework 9

Due: April 14, 2021 11:59pm

Setup:

In this homework you will design and model a hand-operated water pump. In some emergency situations, a pump that can displace water without using electricity is critical for survival. Your task is to design a hand-operated pump with a few requirements.

Requirements:

The pump should satisfy the following requirements:

1. Total maximum weight: 5lbs
2. Inlet/Outlet port inner diameter: 2 inches

Your model should have:

1. A pumping mechanism
    a. You can include one-way valve designs
2. Inlet and outlet ports for water to be pumped
3. Material selection for all parts

Examples:

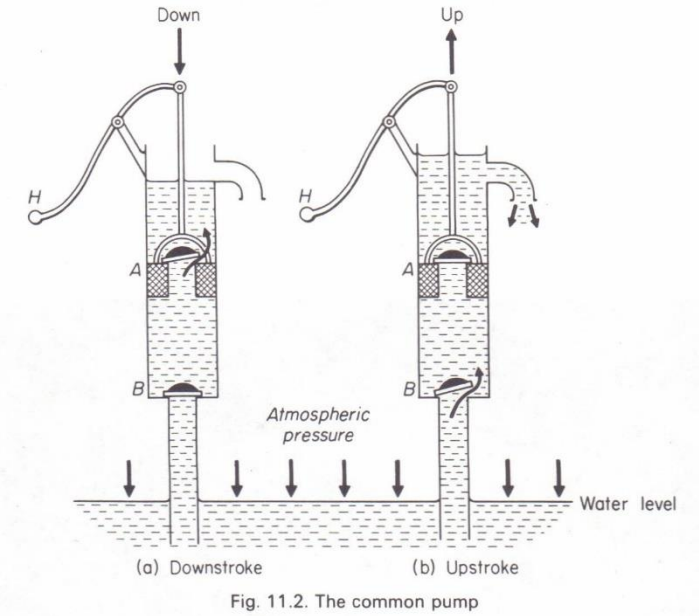
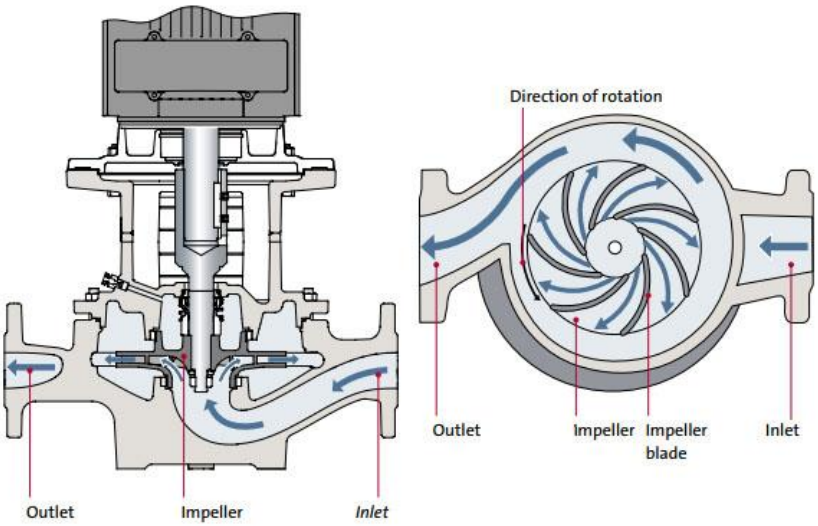


Fig. 11.2. The common pump

This is a common well pump design that uses one-way valves (A and B) as well as atmospheric pressure and vacuums to pump water up a main shaft pipe. See the following video for one-way valve designs:

https://www.youtube.com/watch?v=c8YTsoq3VsU

This is just one way to design your valve. You can choose to design it any way you'd like so long as the valve would reasonably operate under normal conditions.



This is an impeller-type water pump that uses spinning blades to push water out through the outlet port, causing suction to occur, drawing water in through the inlet port. The whole thing must be water-tight for this to work, otherwise the pressure will cause a water leak. Watch the following video for an overview of an impeller driven pump:

https://www.youtube.com/watch?v=BaEHVpKc-1Q

Deliverables

For this homework assignment, you can create as many parts as necessary. Remember what the definition of "part" is for this class.

Once your parts are created, assemble them all and make sure that the assembly operates the way that it was designed.

Submit all your parts and your assembly file.

Compress them all into a single ZIP file named: ***username*_HW9.zip**

Rubric:

Item	Points
All parts have materials	8
All parts have fully defined sketches	8
Assembly is fully defined	8
Assembly is constrained to realistic motion	8

Assembly is not over 5lbs	4
Inlet and Outlet ports are 2in in diameter	4
Total	40