PH 203

PROJECT

THROUGHPUT AND PUMPING SPEED IN A VACUUM CHAMBER

FARHAAN ALAM
2001ME25

GAURAV GARG
2001CS83

SHIVAM YADAV
2001ME70

THEORY

THROUGHPUT

Rate of Gas Flow

Quantity of gas d(pV) crossing a plane along a duct in unit time dt. From the ideal gas law written per unit time, we see that this is a energy flow rate.

It’s Unit is given by: Pa.m3.s-1

PUMPIMG SPEED

Pumping speed is formally defined as the ratio of the throughput of a given gas to the partial pressure of that gas at a specific point near the inlet port of the pump.

It’s unit is given by: m3.s-1

FORMULAE
(SUCTION CHAMBER)

$$\text{Throughput}(Q) = q.pV$$

$$\text{Throughput}(Q) = N(Vs^* Pin - VD.S^* Pout)$$

$$\text{Pumping Speed}(S) = (Q / Pin)$$

N = Rotational Speed
Vs = Suction Chamber Volume
Pin = Input Pressure
VD.S = Dead Space Volume
Pout = Output Volume

FORMULAE
(GAS EQUATION)

$$\text{Throughput}(Q) = P.(dV / dt) = nRT / t$$

$$\text{Pumping Speed}(S) = (Q / P)$$

n = Moles of Gas
P = Pressure
T = Temperature
t = Time

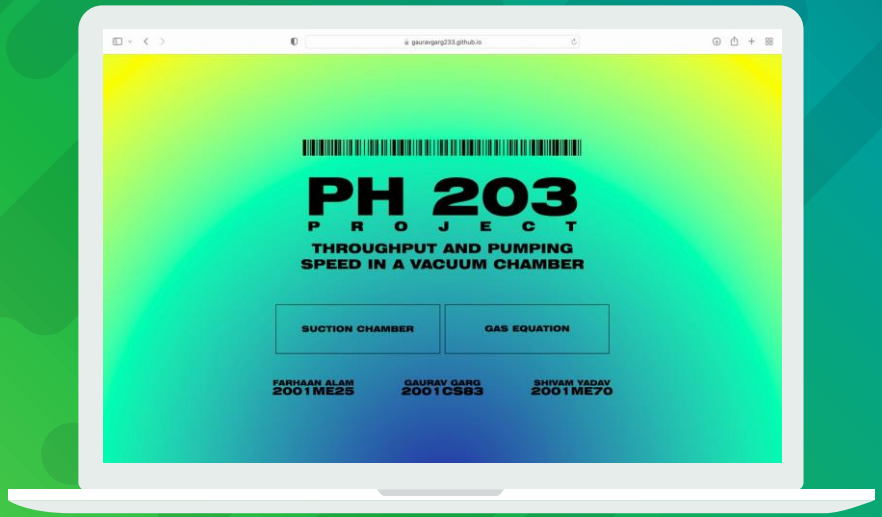
PROJECT DISPLAY

Code (VacuumProject.html) and all the necessary files are attached with the mail.
Website Link is given on the next page.

Project Link: https://gauravgarg233.github.io/vacuumproject/

Instructions for Usage:

1. Click on the above link (or) Copy paste the link in any web browser
2. After opening you will be able to see a home page which looks something like this:

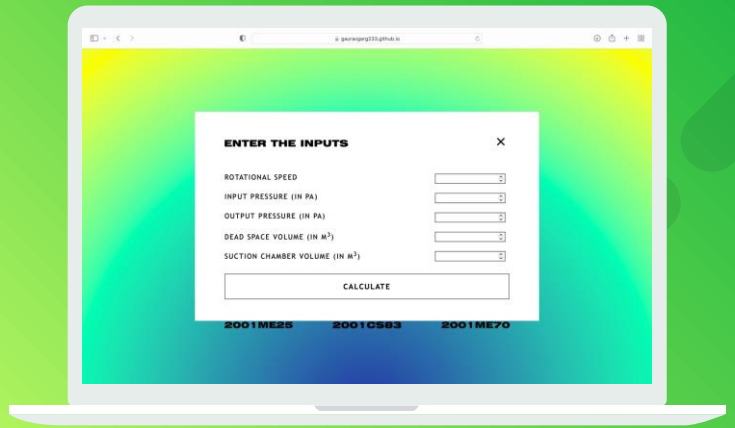


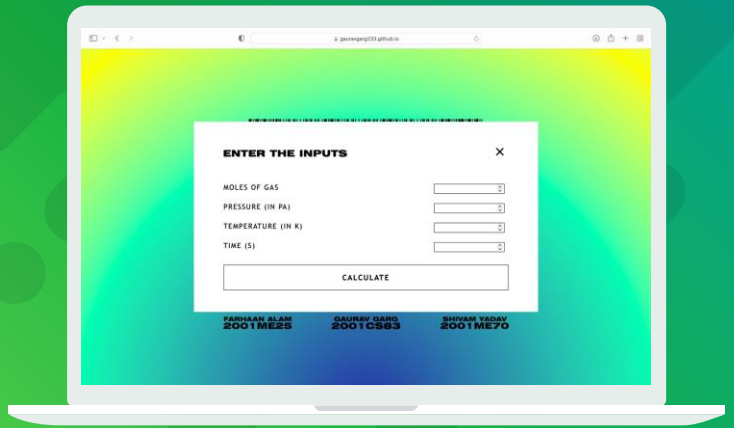
Project Link: https://gauravgarg233.github.io/vacuumproject/

3. There are two ways of calculation:

- Suction Chamber
- Gas Equation

4. Click on any of these two text to open the calculation dialogue box. The calculation dialogue box looks like:





Project Link: https://gauravgarg233.github.io/vacuumproject/

TEST CASE FOR SUCTION CHAMBER

Enter your values for calculation.

For Example:

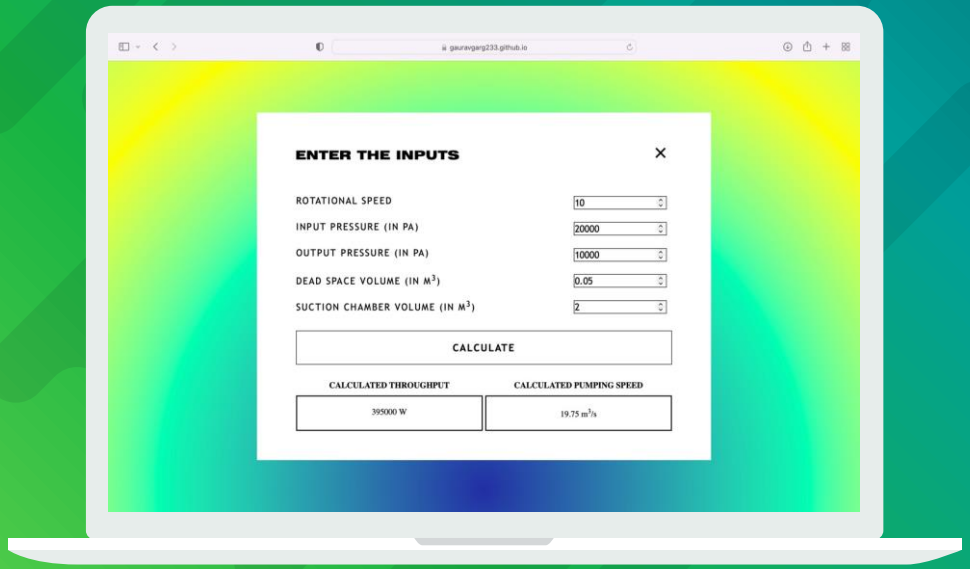
N = 10, Vs = 2

Pin = 20000, VD.S = 0.05

Pout = 10000

Now click on Calculate.

The Calculated values are shown along side.



Project Link: https://gauravgarg233.github.io/vacuumproject/

TEST CASE FOR GAS EQUATION

Enter your values for calculation.

For Example:

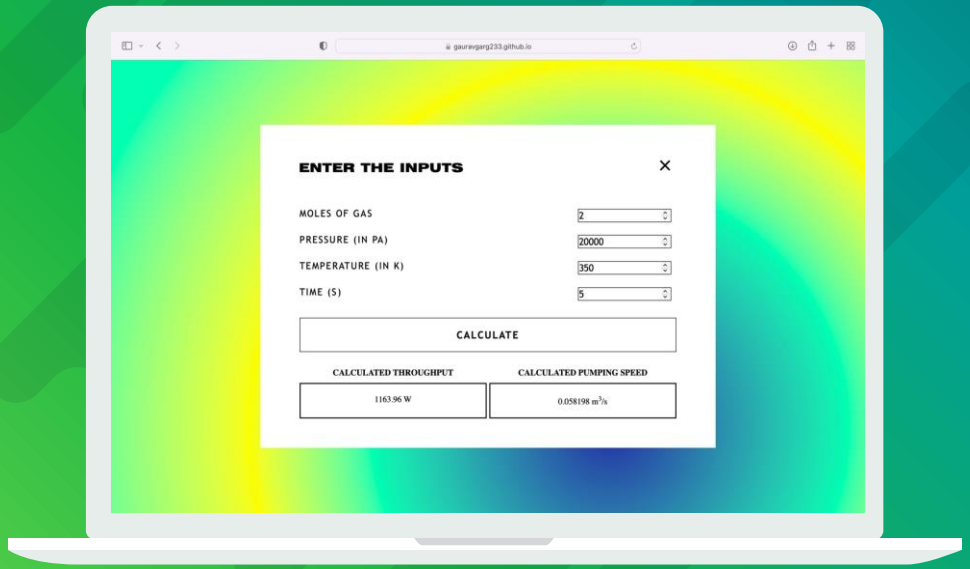
n = 2

P = 20000, T = 350

t = 5

Now click on Calculate.

The Calculated values are shown along side.



CONTRIBUTIONS

FARHAAN ALAM
2001ME25

“I contributed towards the UI/UX design of the website and the overall design of the project.”

GAURAV GARG
2001CS83

“I understood the question given and acquired the desired results and contributed towards the making of the project report.”

SHIVAM YADAV
2001ME70

“I contributed towards the development of the website whose purpose is to give us the desired output when provided with appropriate inputs.”

THANK YOU!

FARHAAN ALAM
2001ME25

GAURAV GARG
2001CS83

SHIVAM YADAV
2001ME70