

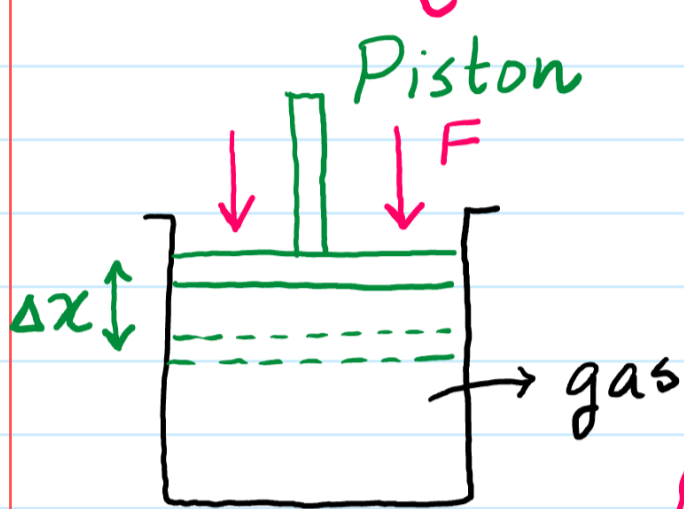
Formula for calculating Work done in case of gases.

The diagram below shows a container filled with a gas. The gas pressure is denoted as P .

A piston is positioned as shown. The area of the piston is denoted by A . We apply a force F downwards on the piston so that the piston moves through a small distance Δx . In this case, since the gas molecules will get "compressed" \therefore we use the term

Work is done ON the gas.

This value can be calculated as shown



W.d on the gas

$$F \cdot \Delta x$$

$$P \cdot A \cdot \Delta x$$

$$W = P \cdot \Delta V$$

$$A \cdot x = V$$

$$A \cdot \Delta x = \Delta V$$

where ΔV represents "Change in Volume"

Q: A press. of 100 KPa causes volume of a gas to change from 50 cm³ to 35 cm³

$$W.d \text{ on the gas} = P \cdot \Delta V$$

$$= 100 \times 10^3 \times (15 \times 10^{-6})$$

$$= 1.5 \text{ J}$$

Reverse application

W. done BY the gas:

If the gas undergoes expansion which causes the piston to move upwards, then we use the term W. done BY the gas.

$$W.d \text{ by the gas} = P \cdot \Delta V$$

Q $P = 100 \text{ KPa}$
Volume of the gas changes from 100 cm³ to 140 cm³.

$$W.d \text{ BY the gas} = P \times \Delta V$$

$$= 100 \times 10^3 \times 40 \times 10^{-6}$$

$$= 4 \text{ J.}$$

Graph. If a graph of Press. against Volume.

Then Area under graph gives a value for W. done

