

PHY 117 HS2024

Week 6, Lecture 1

Oct. 22nd, 2024

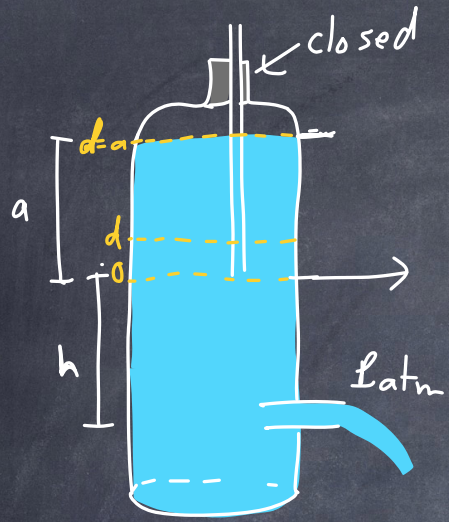
Prof. Ben Kilminster

Please do weekly
quizzes, for your
own good!
You can do past weeks any
time.

Thermodynamics - study of temperature, heat,
and the exchange of energy.
(mechanical
work)

Macroscopic state: measurable properties:
Volume, pressure, temperature,
↓
force/area

Marriott's bottle:





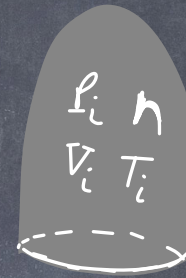


Why does our hot air balloon rise when air inside is heated?

pressure decreases?

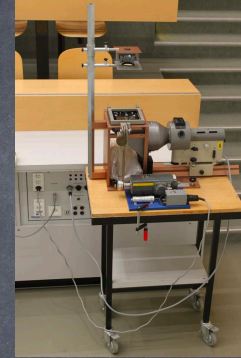
density decreases?

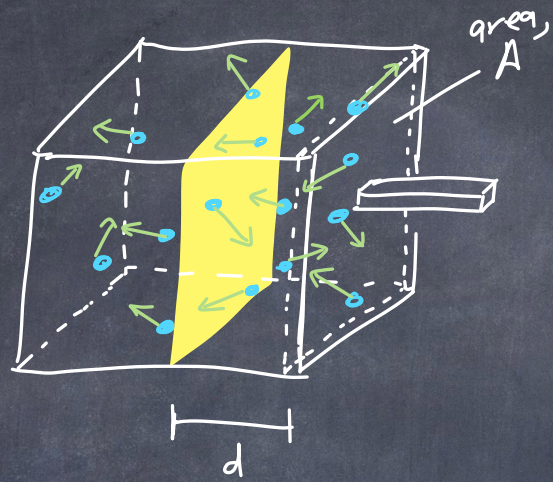
volume increases?





But what is
temperature really?
At the molecular
level?





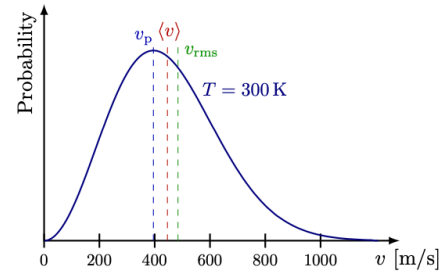




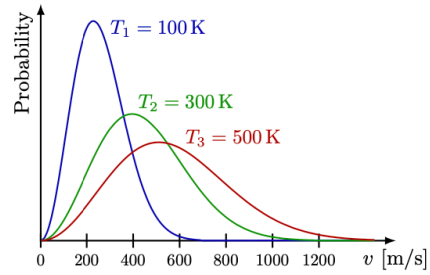








(a) The distribution is asymmetric.



(b) For different temperatures.

Figure 17.4: Maxwell-Boltzmann distribution for oxygen gas O_2 with atomic weight ~ 16 per atom.

Quiz 3

The area under the force vs. time curve represents work.

4

70

92

The area under the velocity vs. time curve represents acceleration.

3

101

62

The dot product of a constant force and the 1-D distance the force pushes an object is the work.

6

93

67

Quiz 3

If the object reaches a constant velocity (terminal velocity), gravity is still doing work on the object.

2

105

59

If the object reaches a constant velocity (terminal velocity), there is no net work on the object.

5

77

84

Question

Total energy is conserved

Which is true about inelastic collisions?

2

89

75

Momentum of the whole system is conserved

2

100

64

Quiz 4

When torque is zero, angular momentum is zero.

1

41

38

Question

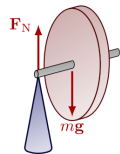
Which direction does a spinning object precess.

In the direction of the angular momentum of the spinning object.

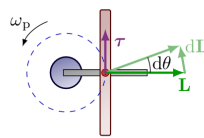
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31

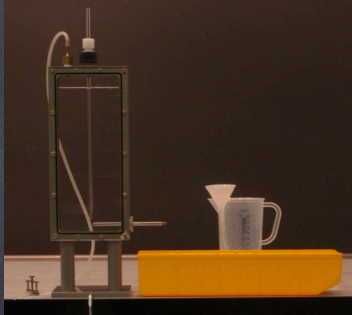
42



(a) The handle allows the disk to spin around its axis and around the pivot.



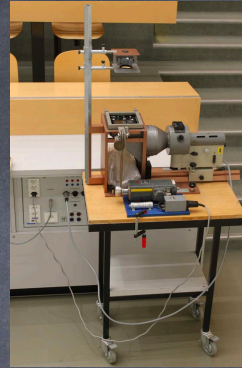
(d) Torque τ perpendicular to angular momentum L , will only change its direction.



H21



Th57



Th36



Th58



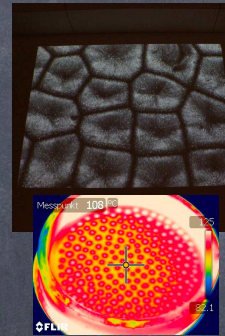
Th12



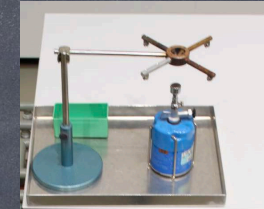
Th63



Th54



Th35



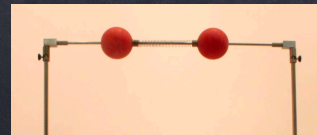
Th20



Th19



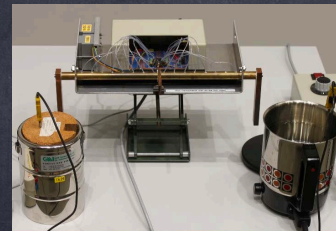
Th28



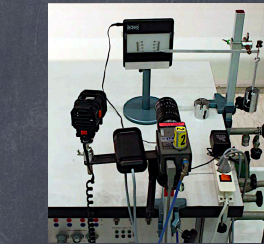
Th27



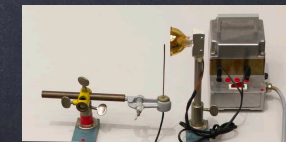
Th2



Th22



E12



Th48