



**INDIAN INSTITUTE OF TECHNOLOGY
PATNA
DEPARTMENT OF PHYSICS
Mid Semester Examination**

26/02/2019

PH603 PHYSICS OF ULTRACOLD ATOMS

Total Marks = 30

1	Sketch the experimental set up of Magneto -Optical Trap (MOT) starting from all the lasers to vacuum chamber. (Label all the components and explain its use)	5
2	What are the Limitations of MOT? Derive the expression for Doppler limited temperature	4
3	Derive the expression for net force experienced by atoms in a Magneto Optical trap and compare this with any damped harmonic oscillator	8
4	Sketch the complete experimental sequence of various parameters from Optical Molasses to MOT to Magnetic Trap	5
5	Explain the role of Re-pumping laser in Doppler cooling taking Rb^{87} as an example	3
6	Explain the principle behind Magnetic trapping	5