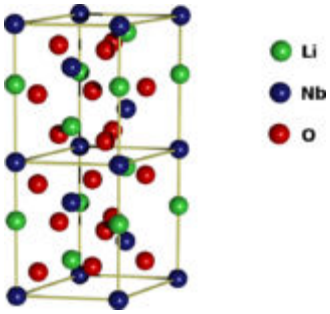

EXAM: What is „**Condensed matter”**

http://physics.nmt.edu/~raymond/classes/ph13xbook/node34.html

Condensed matter physics

From Wikipedia, the free encyclopedia

*WordWeb→Verb:**Condense**=Undergo condensation; change from a gaseous to a liquid state and fall in drops, "water condenses"=Compress or concentrate: "Congress condensed the three-year plan into a six-month plan"= Remove water from: "condense the milk"=Cause a gas or vapor to change into a liquid: "The cold air condensed the steam"*

Condensed matter physics (CMP) focuses on understanding the collective properties of matter and how they arise. CMP is relevant to much of modern technology, including the semiconductor industry.
http://en.wikipedia.org/wiki/Condensed_matter_physics

Condensed matter physics

Condensed matter physics is the field of physics that deals with the macroscopic physical properties of matter. In particular, it is concerned with the "**condensed**" phases that appear whenever the number of constituents in a system is extremely large and the interactions between the constituents are strong. The most familiar examples of condensed phases are solids and liquids, which arise from the bonding and electromagnetic force between atoms. More exotic condensed phases include the superfluid and the Bose-Einstein condensate found in certain atomic systems at very low temperatures, the superconducting phase exhibited by conduction electrons in certain materials, and the ferromagnetic and antiferromagnetic phases of spins on atomic lattices.

Condensed matter physics is by far the largest field of contemporary physics. Much progress has also been made in theoretical condensed matter physics. By one estimate, one third of all American physicists identify themselves as **condensed matter physicists**.

P.S. Historically, condensed matter physics grew out of solid-state physics, which is now considered one of its main subfields. The term "**condensed matter physics**" was apparently coined by Philip Anderson and Volker Heine when they renamed their research group at Cavendish Laboratory - previously "solid-state theory" - in 1967. In 1978, the Division of Solid State Physics at the American Physical Society was renamed as the Division of Condensed Matter Physics.[1]

Condensed matter physics has a large overlap with chemistry, materials science, nanotechnology and **engineering**.

One of the reasons for calling the field "**condensed matter physics**" is that many of the concepts and techniques developed for studying solids actually apply to fluid systems. For instance, the conduction electrons in an electrical conductor form a type of quantum fluid with essentially the same properties as fluids made up of atoms. In fact, the phenomenon of **superconductivity**, in which the electrons condense into a new fluid phase in which they can flow without dissipation, is very closely analogous to the superfluid phase found in helium 3 at low temperatures.

Topics in condensed matter physics

- **Phases**
  - *Generic phases* - Gas(* uncondensed); Liquid; Solid
  - *Low temperature phases* - Bose-Einstein condensate; Fermi gas; Fermi liquid; Fermionic condensate; Luttinger liquid; Superfluid; Composite Fermions; Supersolid
  - *Phase phenomena* - Order parameter; Phase transition; Cooling curve
- **Crystalline solids**
  - *Types* - Insulator; Metal; Semiconductor; Semimetal
  - *Electronic properties* - Band gap; Bloch wave; Conduction band; Effective mass; Electrical conduction; Electron hole; Valence band
  - *Electronic phenomena* - Kondo effect; Plasmon; Quantum Hall effect; Superconductivity; Wigner crystal; Thermoelectricity
  - *Lattice phenomena* - Antiferromagnet; Ferroelectric effect; Ferromagnet; Magnon; Phonon; Spin glass; Topological defect
- **Non-crystalline solids**
  - *Types* -Amorphous solid; Granular matter; Quasicrystals
- **Soft matter**
  - *Types* - Liquid crystals; Polymers; Complex fluids; Gels; Foams; Emulsions; Colloids

- **Nanotechnology**
  - *Nanoelectromechanical Systems (NEMS)*
  - *Magnetic Resonance Force Microscopy*
  - *Heat Transport in Nanoscale Systems*
  - *Spin Transport*

A soft condensed matter = materials which are easily deformable by external stresses, electric or magnetic fields, or even by thermal fluctuations.