PHYS421	Name:	*Mark* :	*Initials*: VF

Lancaster University Department of Physics

PHYS421 - Adv Solid State (magnetism) and Nanoscale Physics

Michaelmas Term 2006
Sheet 5 (total mark = 10)

1. [3] Describe the principle of operation of scanning tunneling microscope.

2. **Open-ended assignment** [3]: Using internet (Google search for *scanning tunneling microscope*), find one example demonstrating how STM can be used. Describe what observations have been made in the example that you found, supplementing your report with the printout of a scan from the corresponding website.

3. [2] Describe qualitiatively the phenomenon of screening of charged impurities in metals.

4. [2] Describe qualitative the origin of *Friedel oscillations* in metals.

THIS SHEET MUST BE ATTACHED TO YOUR ANSWERS. Inserting your name in the appropriate place at the top of this page. Please ensure your work is clearly legible. Do not submit your work in folders or plastic sleeves. Your answers should be placed in the appropriate in-box in the Physics Foyer not later than 16:00 on Wednesday, 29 November 2006. Work handed in after the above time and before 11 am on the following Monday will be subject to a 50% reduction of mark. Work handed in later than this will not count towards your continuous assessment.

I declare that this submission is my own work. I have not submitted it in substantially the same form towards the award of a degree or other qualification. It has not been written or composed by any other person and all sources have been appropriately referenced or acknowledged.

Signed: