Course: Math 6221 – Homework 1 (Fall 2005)

Instructor : Prasad Tetali, office: Skiles 234, email: tetali@math.gatech.edu Office Hours: Mon. Tue. 11-12, Thurs. 2-3pm

Due: Thursday, Sept. 1st

The following exercises are all from the Grimmett-Stirzaker book (3rd ed., 2001). Please stop by my office, if you don't have a copy of the book. I can give a copy of the problems.

Problem 1. Exercise 1.4.5

(This is just to test basic knowledge of conditional probability, and since this is a classic problem.)

Problem 2. Exercise 1.8.16

Problem 3. Exercise 1.8.17

Problem 4. Exercise 1.8.18

Problem 5. (a) Let Ω be a set and let A_1 and A_2 be subsets of Ω . Show that the smallest σ -algebra containing A_1 and A_2 consists of at most 16 sets.

(b) Let A_1, A_2, \ldots, A_k be subsets of Ω . Let \mathcal{F}_{\parallel} be the smallest σ -algebra containing the A_i 's. Show that \mathcal{F}_{\parallel} has at most 2^{2^k} members.

(c) Show that the upper bound in part (b) can not be improved. (*Hint*: Let M be the k-element set $\{p_1, \ldots, p_k\}$, and let $\Omega = 2^M$ be the set of subsets of M. Let A_i be all subsets of M that contain the point p_i .