

**Subject 3**  
**Probability**

**Please, do not write on the exam paper.**

**1)** An experiment consists in rolling a dice once. Let  $X$  be the outcome. Let  $F$  be the event  $\{X=6\}$ , and let  $E$  be the event  $\{X>4\}$ .

**a)** If the die is fair, what is the probability of  $F$ , given that  $E$  has already occurred?

**b)** Same question with the distribution :

$x$	1	2	3	4	5	6
$p(x)$	0.2	0.2	0.1	0.1	0.3	0.1

**2)** We have two urns, I and II. Urn I contains 2 black balls and 3 white balls. Urn II contains 1 black ball and 1 white ball. An urn is drawn at random and a ball is chosen at random from it.

**a)** Represent the sample space of this experiment as the paths through a tree and show the probabilities assigned to the paths.

**b)** Let  $B$  be the event “a black ball is drawn,” and  $I$  the event “urn I is chosen”. Compute the probability of  $B$ , given that  $I$  has already occurred.