## LECTURE 12 EXERCISES

 $\mathbf{1}$  : Do exercises 6.3.12, 6.3.13, and 6.5.8 on pages 277-278 and 293-294 of the Dembo and Zeitouni book.

- 2: Show the rate function I, defined on page 276 of the Dembo and Zeitouni book, is convex.
- 3: Read Section 6.2 on Sanov's Theorem with special attention paid to Lemma 6.2.13.

## Hints :

(1) In exercise 6.3.12*a*) note that for large n and l > 0 an integer you can write

$$\sum_{i=1}^{n} f(Y_i) = \sum_{j=1}^{l} \sum_{k=0}^{p(j,n)} f(Y_{j+kl})$$

where  $p(j,n) = \lfloor \frac{n-j}{l} \rfloor$ . With this in mind, use Holder's inequality and successive conditioning combined with assumption (U).

(2) In 6.3.12b) find the correct function f(l) so that  $\mu(\Gamma_l) \ge 1 - f(l)$ .