LECTURE 5 EXERCISES

1 : Do the following exercises in the Dembo & Zeitouni book:

  i) 2.3.17 on page 51.

 ii) 2.3.19 on pages $51 - 52$.

iii) 2.3.24 on pages $53 - 54$.

2 : (Exercise $V.12$ on page 59 of the Hollander book). Let $(X_i)_{i \in \mathbb{Z}}$ be an $\mathbb{R}$-valued stationary mean-zero Gaussian process with covariance function $C_i = E_P[X_0 X_i], i \in \mathbb{Z}$ satisfying $\sum_{i \in \mathbb{Z}} |C_i| < \infty$. Let $Z_n = \frac{1}{n} \sum_{i=1}^{n} X_i$ and let $\mathbb{P}_n$ be the distribtion of Z_n. Show that $(\mathbb{P}_n)$ satisfies the LDP on $\mathbb{R}$ with rate function $\Lambda^*(x) = \frac{x^2}{2C}$, where $C = \sum_{i \in \mathbb{Z}} C_i$.