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 \(P_n\) be the distribution of \(Z_n\).
Show that \((P_n)\) satisfies the LDP on \(\mathbb{R}\) with rate function \(\Lambda^*(x) = \frac{x^2}{2C}, \) where \(C = \sum_{i \in \mathbb{Z}} C_i\).