- **Problem:** Consider a PIB problem with the grid boundaries at 0 and 10, respectively. The potential is defined as

$$V(x) = \begin{cases} 0, & \text{if } x < 4 \\ 9, & \text{if } 4 \leq x \leq 5 \\ 0, & \text{if } 5 < x. \end{cases} \tag{1}$$

  We will start with c_2=1, and hence, the calculation actually works backward in space to compute c_0 which should be consistent with c_2=1. In extreme left (where the wave is a free wave), the $\psi_{j=0}$ =$exp(-ikx) = 1$. Similarly, at $j = 1$ (at dx), $\psi_{j=1}$=$exp(-ik \times dx)$. Once, these two are known, we can calculate the others using the finite difference scheme. The calculation of P_{avg} will be done from the maximum and the minimum of oscillations. We will calculate this far away from the potential, let us say after 600th point. Use the following values: $\hbar$=1, m=1, dx=0.01. Remember that, $k = \sqrt{2mE}/\hbar^2$. Write a Fortran code to compute the transmission probability as a function of incident kinetic energy. Vary the incident energy from 1 to 26 eV with ΔE = 0.1 eV. Plot "transmission probability" vs "incident kinetic energy". Remember that $t = \dfrac{2}{1 + P_{avg}}$.