1. Exercise 6.4

2. Find a sequence of augmenting paths and thus determine the maximum flow in the following network with capacities as indicated. Indicate a cut whose capacity equals the maximum flow.

3. For the following qualification matrix, use the network model to find an optimal flow assigning as many people as possible, and also find a subset $I \subseteq \{1, 2, 3, 4\}$ such that $|J(I)| < |I|:

$$Q = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}$$
4. Solve the optimal assignment problem for the following aptitude matrix:

\[ A = \begin{bmatrix} 2 & 7 & 1 \\ 8 & 4 & 6 \\ 9 & 3 & 5 \end{bmatrix} \]

5. Solve the transportation problem for the following cost matrix, with row-sums \( s_1 = 8, s_2 = 6, s_3 = 5 \) and column-sums \( d_1 = 3, d_2 = 9, d_3 = 7 \):

\[ C = \begin{bmatrix} 7 & 2 & 5 \\ 4 & 1 & 8 \\ 9 & 6 & 3 \end{bmatrix} \]