1. given two $n \times n$ matrices $A = (a_{ij})$ and $B = (b_{uv})$. QAP asks for a permutation π of $\{1, \ldots, n\}$ minimizing
$$\sum_{i=1}^{n} \sum_{j=1}^{n} a_{ij}\, b_{\pi(i)\,\pi(j)}.$$

2. - let A be the adjacency matrix of your graph:
$$a_{ij} = \begin{cases} 1, & \text{if } (i,j) \in E, \\ 0, & \text{otherwise.} \end{cases}$$
   - let B encode label–products:
$$b_{uv} = u \times v.$$

3. assign labels $\ell(0), \ldots, \ell(n-1)$ is the same as choosing a permutation π, and we want
$$\max_{\pi} \sum_{(i,j)\in E} \ell(i)\,\ell(j) \;=\; \max_{\pi} \sum_{i<j} a_{ij}\,\pi(i)\,\pi(j).$$
$$\max_{\pi} \sum_{i<j} a_{ij}\,\pi(i)\,\pi(j) \;=\; -\min_{\pi} \sum_{i<j} a_{ij}\,\pi(i)\,\pi(j),$$
which (up to the usual factor of 2 in symmetric sums) is exactly
$$\min_{\pi} \sum_{i=1}^{n} \sum_{j=1}^{n} a_{ij}\; b_{\pi(i)\,\pi(j)}.$$