§12.2 Homework Solutions

4) [BB]

5) [BB]

6) 7^5 because every possible spanning tree on 7 vertices is a subgraph of K_7.

7) a) [BB] b) There are 12 falling into 2 isomorphism classes of 6 each

First Isomorphism class: 

Second Isomorphism class: 

8) Let the vertex partition sets be V and W with $V = \{v_1, v_2\}$ and $W = \{w_1, \ldots, w_n\}$

Suppose ≥ 2 vertices in W are connected to both v_1 and v_2. Then $\exists$ 4-cycle. But if no vertex is connected to both v_1 and v_2 then the graph is not connected and so cannot be a spanning tree.

Thus $\exists$ exactly one vertex in W connected to both v_1 and v_2. There are n ways to choose this vertex.
For each of the remaining $n-1$ vertices in W, you can choose whether to connect it to v_1 or v_2. Thus there are 2^{n-1} ways of doing this.

So by the multiplication rule, # spanning trees on $K_{2,n}$ is $\underline{n2^{n-1}}$

9) [BB]