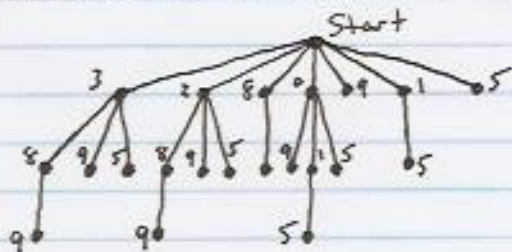


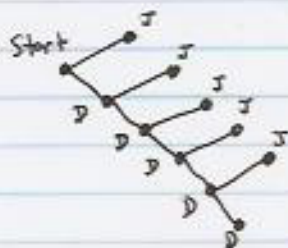
## §12.1 Homework Solutions

1) [BB]

3) There are 13 in total: 7 at level 1, 11 at level 2, 3 at level 3



4)

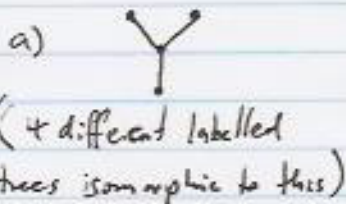


13) a) [BB]

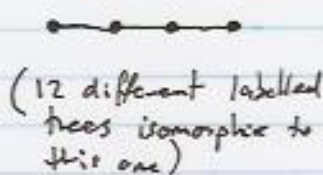
b) 3, one corresponding to each tree in a)

15) [BB]

23)



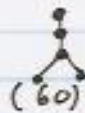
&



&  $12 + 4 = 16 = 4^{4-2} \checkmark$



&



&



$60 + 60 + 5 = 125 = 5^{5-3} \checkmark$

24) We use induction on  $n$ :

Step 2: Result is clearly true for  $n=1$

Step 1: Inductive Hypothesis — suppose result is true for all trees with  $n$  vertices.

Let  $T$  be a tree with  $n+1$  vertices.

Then  $\exists$  vertex  $v$  in  $T$  with  $\deg(v) = 1$

Then  $T \setminus \{v\}$  is a (connected) tree with  $n$  vertices

$\therefore$  By Inductive Hypothesis  $T \setminus \{v\}$  is bipartite

So placing  $v$  in opposite partition set to its neighbouring vertex  
 $\Rightarrow T$  is bipartite. So  $P_n \Rightarrow P_{n+1}$ .

Result holds by Mathematical Induction