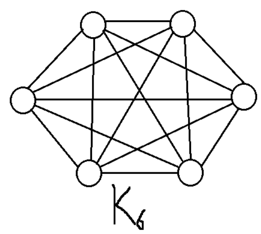
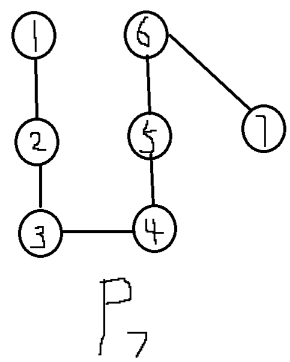
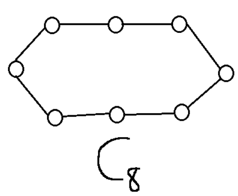
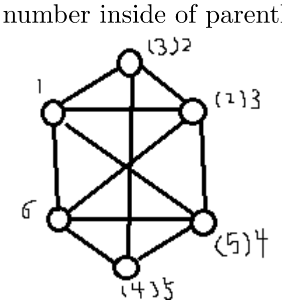
1.







2.
A and B is isomorphic,
First we examine the degree sequence of each:
A:$4, 4, 4, 4, 3, 3$ B:$4, 4, 4, 4, 3, 3$
Next,simply relabel vertices in B : 3 to 2,4 to 5(of course 2 to 3,5 to 4):
The number inside of parentheses is the original label:



We can see it is obviously the same graph as A.So they are isomorphic.

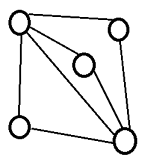
C and D are not isomorphic,although they have same degree sequence.It is very obviously that the edge between 1 and 5, 7 and 3 in C can never be relabeled as 2 to 7 , 3 to 8 in D. This is just because 5 and 7 are not adjacent to each other in C;while in D,7 and 8 are adjacent to each other,there is no way that C and D can be isomorphic graph.

3.

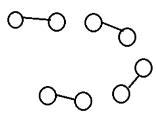
Given n labeled vertices,think it as a board with n points.Every time we just choose 2 points from those n points to construct the edge.There will be over-counting on some isomorphic graph. Since the question treat them as different graph,so the total number of graph is just : $2^{C(n,2)}$

4.

(a)No such graph exist,the total number of degree is odd.According to the definition,the total degree of a graph is even.So no such graph exist.



(b)



(c)

(d)No such graph exist,same as (a),the total degree is odd and also its first vertex has degree of 7,which is impossible to construct 7 edges from that one to rest vertices while the sum of rest is just 6.

5.

There are 6 vertices in total, so we need a 6 x 6 matrix:

$$\begin{bmatrix} 010000 \\ 101000 \\ 010110 \\ 001001 \\ 001001 \\ 000110 \end{bmatrix}$$