

1. A connected graph has an Euler circuit if and only if every vertex of the graph is of even degree.
2. A graph is bipartite if and only if the graph contains no odd cycles.
3. Let $T(n, r)$ be the balanced complete r -partite graph of order n . Then the extremal graph which forbids K_{r+1} is isomorphic to $T(n, r)$. (Turan's Theorem)
4. Any $2k$ -regular graph can be decomposed into k 2-factors. (Petersen's theorem)
5. A complete graph of order n is of class 1 if and only if n is even.
6. Every bipartite graph is of class 1. (Konig's Theorem)
7. The chromatic number of a planar graph is not greater than 4 and the chromatic number of an outer-planar graph is not greater than 3.
8. If G is a graph which is 2-cell embedded in S_k with r regions, then $|G| - ||G|| + r = 2 - 2k$. (Euler-Poincare's theorem)
9. If G is a graph whose minimum degree is larger than $|G|/2$, then G has a Hamilton cycle.
10. In random graph model, almost all graphs are of diameter 2.
11. A complete graph of order n can be decomposed into 4-cycles if and only if $n \equiv 1 \pmod{8}$.
12. Every cubic planar graph is 3-edge colorable.
13. The diameter of a connected graph G is less than the number of distinct eigenvalues.
14. Let J be the all 1's $n \times n$ matrix. Then a graph G is regular and connected if and only if J is a linear combination of powers of $A(G)$ where $A(G)$ is the adjacency matrix of G .
15. Petersen graph is a strongly regular graph.