A connected graph G is Eulerian if and only if its edge set can be decomposed into Cycles.

Let graph G be decomposed into k cycles which are incident on vertex v. Then the degree of vertex will be 2k. Similarly it can be for every vertex.Thus degree of each vertex in G will be even which satisfies the property of eulerian graph.

Also now let G graph be eulerian. Thus we know degree(vertex) >=2k. Let us suppose we have cycles C1,C2….Ck whose in turn degree of each vertex will be 2 so as to satisfy the property of cycle.now G-edge(c) will be a disconnected graph with each cycle C1,C2….Ck as shown above.By induction hypothesis we can say that each Ci is a disjoint union of cycles. Thus considering above two proves we can conclude that a connected graph G is eulerian iff its edge set can be decomposed into cycles.