The optimization problem feedback edge set is the following:
Given a directed graph $G(V, E)$, find a minimum subset $E' \subseteq E$ such that $E'$ contains at least one edge from every directed cycle in $G$.
It is suggested to solve the problem by applying DFS to find backward edges, and including all the backward edges in the set $E'$.

(1) Suppose that it had been possible to prove that this algorithm always finds the minimum feedback edge set. What would this have implied about the classes NP, P and NPC? Explain your answer.

Answer: P=NP=NPC

Explanation: The algorithm has polynomial time complexity. A polynomial time algorithm for the optimization problem FES would imply the existence of a polynomial time algorithm for the decision problem FES. The decision problem is NPC. A polynomial time algorithm for one NPC problem implies the existence of a polynomial time algorithm for all the problems in NP.
(2) Use the following graph to argue that this algorithm is not guaranteed to find the minimum feedback edge set.

The minimum feedback edge set is (B,C).
If DFS starts from B, it will find the backward edges (A,B) and (D,B). This will result in a feedback edge set that is larger than the minimum.