Task

☑ Worst-case of Chu-Liu-Edmonds
☑ Explain how you came to this
☑ Use V = vertices and E = number of edges

The worst case complexity of Edmonds Algorithm is O (EV).

The reason for this is straight forward. The worst case of Edmonds algorithm implies as many cycles appearing as possible since that's when the most operations happen (comparisons and assignments).

First the Edmonds algorithm visits every vertex creating a forest.

Then Edmonds compares all the edges for each Vertex and keeps the minimum incoming edge.   E so far since every edge is compared.

Because we are searching for the worst case, we assume there is at least 1 cycle formed. This implies that after Edmonds breaks (solves) the cycle problem we have one less forest as the formula guarantees to reduce the number of forests by 1. If no cycles were found then the Minimum Spanning Tree would already be found but the algorithm wouldn't be done confirming the tree has been found.

We then repeat by keeping the min edge incoming to every forest/subtree. Again a cycle must be formed in assuming the worst case. So we search every edge again. E + E

This cycle continues as the number of forests is decreased by 1 (at worst) each time we visit all the edges in order to break cycles that are formed. This is how we come to O (EV) as all the edges are visited V times.