We will show that the Petersen graph does not have a Hamilton cycle, using the fact that it does not have a 3-cycle or 4-cycle.

(See Ch. 11, #12)

Assume instead that it has a Hamilton cycle; since there are 10 vertices, we can represent it like this!

Now we have 5 more edges to insert.

A) Explain why these edges must pair up the vertices.

B) Explain why we cannot have every vertex joined to the opposite vertex.

C) Show that if not every vertex is joined to the opposite vertex, then some vertex is joined to a vertex 4 places away.
   (We can assume, without loss of generality, that 1 is joined to 5.)

D) Show that 10 cannot be joined to any vertex.