THE SIX TYPES OF SOCRATIC QUESTIONS

Due to the rapid addition of new information and the advancement of science and technology that occur almost daily, an engineer must constantly expand his or her horizons beyond simple gathering information and relying on the basic engineering principles.

A number of homework problems have been included that are designed to enhance critical thinking skills. Critical thinking is the process we use to reflect on, access and judge the assumptions underlying our own and others ideas and actions.

Socratic questioning is at the heart of critical thinking and a number of homework problems draw from R.W. Paul's six types of Socratic questions:

1. Questions for clarification:	• Why do you say that? • How does this relate to our discussion? • "Are you going to include diffusion in your mole balance equations?"
2. Questions that probe assumptions:	• What could we assume instead? • How can you verify or disapprove that assumption? • "Why are neglecting radial diffusion and including only axial diffusion?"
3. Questions that probe reasons and evidence:	• What would be an example? • What is....analogous to? • What do you think causes to happen...? Why:? • "Do you think that diffusion is responsible for the lower conversion?"
4. Questions about Viewpoints and Perspectives:	• What would be an alternative? • What is another way to look at it? • Would you explain why it is necessary or beneficial, and who benefits? • Why is the best? • What are the strengths and weaknesses of...? • How are...and ...similar?

	• What is a counterargument for...? • "With all the bends in the pipe, from an industrial/practical standpoint, do you think diffusion will affect the conversion?"
5. Questions that probe implications and consequences:	• What generalizations can you make? • What are the consequences of that assumption? • What are you implying? • How does...affect...? • How does...tie in with what we learned before? • "How would our results be affected if neglected diffusion?"
6. Questions about the question:	• What was the point of this question? • Why do you think I asked this question? • What does...mean? • How does...apply to everyday life? • "Why do you think diffusion is important?"

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