

## A First Course on Kinetics and Reaction Engineering

### Unit 12 Additional Quiz Questions

1. True or false? Values for equilibrium constants can often be calculated without the need to perform experiments.
2. Which of the following is NOT a step in the procedure for generating a rate expression?
  - a. Gather experimental data
  - b. Calculate the rate coefficients using *ab-initio* quantum chemistry
  - c. Decide whether the fit of the design equation to the data is acceptable
  - d. Gather experimental data
  - e. Pick a mathematical function to be tested as a rate expression
3. True or false? The procedure for generating a rate expression is only used when the reaction is non-elementary.
4. True or false? Kinetics data are used to determine whether the mathematical form of a given rate expression is capable of describing how the rate of reaction varies as a function of the environmental variables.
5. True or false? Kinetics data are used to determine values for two parameters appearing in rate expressions, namely the enthalpy of reaction and the molecularity of the reaction.
6. True or false? External transport limitations are said to exist if there is a concentration gradient between the bulk fluid and the inlet to the reactor.
7. True or false? A reactor can be modeled as ideal if there are temperature gradients, but not concentration gradients between the bulk fluid and the external surface of the catalyst.
8. True or false? When internal concentration gradients are severe, the reaction actually takes place at multiple concentrations.
9. True or false? Strong external concentration gradients typically result in an apparent first order rate expression.
10. True or false? The conversion in a PFR operated at constant residence time with varying linear flow velocities will vary as the linear flow velocity varies if internal transport limitations are affecting the rate.
11. True or false? Computational tests, in the form of inequalities, have been developed to help determine whether external transport limitations are affecting the measured rate.
12. True or false? Internal temperature gradients are more likely than external temperature gradients.
13. True or false? Internal concentration gradients are more likely than external concentration gradients.
14. True or false? For a fixed amount of catalyst in the absence of internal transport limitations, the conversion will change as the size of the catalyst particles changes.
15. True or false? Computational tests, in the form of inequalities, can be used to test for internal transport limitations.
16. True or false? For a PFR, it is preferable to operate adiabatically when collecting kinetics data.
17. True or false? For a CSTR, it is preferable to operate at steady state when collecting kinetics data.
18. True or false? It is often wise to collect data in blocks where the composition is the same and only the temperature varies.
19. True or false? It is preferable to operate a batch reactor at steady state when collecting kinetics data.
20. True or false? A single batch experiment can yield several kinetics data points.

21. True or false? In the regime where a laboratory CSTR is perfectly mixed, the conversion of a reactant should not depend upon the speed of stirring.