

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI, PILANI CAMPUS
CHEMICAL ENGINEERING DEPARTMENT

Course Title: Process Intensification (CHE G620)

Mid Semester Test (Closed Book)

Marks: 50

Date: 05/10/16

Time: 90 minutes

1. (6 Marks)

What do you understand by Three-Levels-of-Porosity (TLP) Reactors? Explain the Membrane-Enclosed Catalytic Reactor (MECR) used in the production of fatty acids.

2. (4 Marks)

Discuss the effect of the rotational speed and volumetric liquid flow rate on the mean liquid film thickness in the spinning disk reactors.

3. (5 Marks)

Usually, increase in pipe velocity increases the turbulence and hence, provide better mass and heat transfer. Why and which alternative strategies have to be explored for lowering the Reynold number for intensification of heat and mass transfer?

4. (3 Marks)

It is often desirable to have plug flow operation rather than CSTR. Why?

5. (2 Marks)

In SDR, If $Fo < 0.02$, which theory is employed to determine local mass transfer coefficient?

6. (5 Marks)

Under what circumstances, Taylor-Couette Reactor would be preferred over spinning disc reactor. What are the advantages and applications of Taylor-Couette Reactor?

7. (3 Marks)

Make a comparison between plate-type, spiral and plate-fin type heat exchangers.

8. (6 Marks)

On what basis will you classify the heat transfer enhancement techniques? Write the name of four techniques from each category and also explain one of the technique from each.

9. (2 Marks)

Define the process intensification precisely and give the reasons for taking so long for its acceptance.

10. (5 Marks)

Explain the Rotating Packed Beds (RPBs) for gas and liquid continuous operations with schematic diagram. Also make comparison between RPBs and packed bed.

11. (4 Marks)

If the residence time for a given reaction is more, then which type of reactors would you prefer and why?

12. (5 Marks)

Write the name of three Heat Exchanger Reactors and describe any one in detail.

ALL THE BEST