**Question bank**

**I. Petroleum refining processes (General overview and FCC)**

1. What are the general challenges in the chemical industries?
2. Write the different sources of raw materials for production of chemicals?
3. Draw the general flow sheet of a chemical process
4. Write the information needed for to draw a P& I diagram
5. Write about the Indian and world scenario of petroleum industries
6. Draw the flow scheme of a typical complex modern oil refinery
7. Why do we need to refine the crude oil?
8. What are the physical properties of crude oil?
9. What are the major refining process?
10. In which refining processes noble metals are used
11. Define octane and cetane number
12. What are principal reactions (with examples) happening in catalytic cracking process? What is the most undesirable reaction in catalytic cracking and write the reaction mechanism
13. Draw the flow sheet of FCC and explain the process with reaction parameters
14. Why do we need the riser in the FCC unit and how much conversion happens there?
15. Draw the generic correlation of conversion and yield in the FCC?
16. Why we need regenerator in FCC? Explain their function
17. How much amount of coke is generated if the reactors are operated in LPG, gasoline and diesel mode?
18. What are the two main considerations in the operation of regenerator and write their consequences.
19. Write the consequence of uncontrolled burning of CO in FCC unit? How to control it?
20. Justify the advantages of FCC over moving bed reactor.
21. What are key developments happened in FCC process?
22. Write the function of catalysts involved in FCC unit
23. What is the role of rare earth metals in FCC catalyst
24. Explain the design parameters of FCC catalyst. Why do we need metal passivators?
25. What are the major process variable in FCC unit and explain their importance.

**II) catalytic reforming**

1. Explain the desirable and undesirable reactions in catalytic reforming unit
2. Hydrocracking can improve the octane number but it is undesirable in the case of catalytic reforming reaction. Why?
3. Explain the catalytic reforming reaction with flow sheet. Explain the need of the each unit.
4. Explain the design parameter of catalyst. Why do we need Re?
5. Write the pros and cons of the different types of catalytic reforming units
6. Why do need to do the pretreatment in catalytic reforming unit
7. Explain the effect of T, P and H2 recycle and space velocity, LHSV in catalytic reforming unit

**III) Isomerization process**

1. What is the objective of isomerization reaction and catalyst design
2. Explain the isomerization process with flow sheet.

**IV) Alkylation process**

1. Write the objectives of alkylation reaction with examples.
2. Explain the mechanism of alkylation of 2-butene with iso-butane.
3. Explain the different catalyst used in alkylation reaction
4. Why do we need to maintain the concentration of H2SO4 in the range of 88-98%?
5. Explain autorefrigeration and effluent refrigeration process.
6. Why do we need caustic wash in alkylation process?
7. Explain the reactor configuration in autorefrigeration and effluent refrigeration process.
8. Explain the bottlenecks in the autorefrigeration and effluent refrigeration process
9. How does the refrigeration occurred in autorefrigeration and effluent refrigeration process
10. Explain the Philips HF alkylation process
11. Why do we need to dry the feed?
12. Explain the process variables in the alkylation process.