CH-429

End Sem Examination Time 2.5 hours

Part A: *Each question carries 2 mark*

1. Suggest schematically how styrene is manufactured. How poly-alkylation is prevented during the process?
2. Among soft and hard tyres, which has more crosslinking; (ii) draw the structure of crossed linked bonds; (iii) Which tyre is more durable?
3. Using isobutene and an alcohol a high octane rating additive is produced. Write the chemical reaction. What is the structure of the product?
4. What is catalytic reforming? What is the purpose? Give examples of any reforming process (with a balanced equation).
5. Take two terminal n-propyl radicals and draw the structure of: (i) termination product, (ii) disproportionate product(s).

Part B:

6. Write down the structure of the "intermolecular chain transfer reaction product (a branched product)" of a terminal *n*-butyl radical with *n*-butane.
7. A terminal *n*-heptyl radical (A) undergoes an intramolecular chain transfer process. Draw the structure of the new radical (B). Which radical (A or B) is more stable and why?
8. During the polymerization of ethylene lower pressure results in extensive branching. Why? How linear polymer can be manufactures at low pressure?
9. During the manufacture of ethylene glycol from ethylene oxide, diethylene glycol (DEG) and triethylene glycol (TEG) are also obtained. Write the equation for the formation of DEG and TEG. Suggest how to prevent their formation.
10. Suggest a method for synthesizing scrubber(s) from ethylene oxide and ammonia.

Part C:

11. Long-chain alkyl phenols with ethylene oxide give no tears shampoo formulation. Draw its structure.
12. Suggest a method for the synthesis of the monomeric unit of Fevicol from ethylene.
13. Define "tacticity". Draw the tacticity (structure) of the commercial polypropylene polymer.
14. How propane and propylene can be separated by converting one of them into a useful product "antiseptic rubbing alcohol".
15. How acetone is produced from cumene. Write the essential reagents/steps and final products.

Part D:

16. What is gas hydrate? What is its consequence? How to prevent its formation?
17. Suggest the best synthetic method of isobutyl ketone (without using H_2/Pd).
18. Glycerol and ethylene oxide form a foam under basic conditions write down its structure.
19. Write the reaction product of propylene glycol with propylene oxide. Suggest two use of the product.
20. Suggest a synthetic method of acrylonitrile monomer from ethylene oxide.

Part E:

21. Write the photochemical chlorination of ethane. If the reaction stops at the dichloride stage which dichloro product will be formed as the major product?
22. Dehydrogenation of *n*-butane provides four alkenes and a diene. Write their structure.
23. What is oxygenated gasoline additive? What is the purpose? How it is manufactured?
24. Draw the 1,2 and 1,4-bromination product of cyclic six membered conjugated dienes.
25. What is isoprene? How it is synthesized? Write each step.

Part F:

26. What is sulfolane? How it is synthesized? What are its uses?
27. How acidic gases like CO_2 and SO_2 are removed by the Chemisorption method?
28. Take any C10-alkane and show how ethylene and propylene can be obtained via thermal cracking path (C–C bond cleavage). Show the complete cracking steps.
29. Take any C10-alkane and show how ethylene and propylene can be obtained via thermal cracking path. (C-H bond cleavage). Show the complete cracking steps
30. Take any cyclic hydrocarbon and show how butadiene unit(s) can be produced via thermal cracking process.