

Bachelor of Chemical Engineering 3rd Year (1st Semester) Examination, 2017(OLD)

CHEMICAL TECHNOLOGY -II

Time: Three Hours

Full Marks: 100

Use a separate Answer-Script for each part

Part I

Answer any three questions

All questions do not carry equal marks

1. (i) Describe Merox sweetening process for removal of mercaptans from petroleum feedstock using a process flow diagram mentioning the reactions involved. [6]
- 1.(ii) Explain graphically the effects of residence time, temperature and hydrocarbon partial pressure on the yield of ethylene in thermal cracking of naphtha. [6]
- 1.(iii) (a) What is the effect of ammonia to ethylene oxide molar ratio in governing the yield pattern of ethanolamine(s)?
- (b) How are the ethanolamine(s) purified? [4+2]
- 2.(i)(a) Enumerate the acetylene-ethylene combined scheme for production of Vinyl chloride monomer(VCM) using a block flow diagram . Elucidate the role of oxychlorinator in the production of VCM when ethylene is used as feedstock.
- (b) "A low O₂ concentration and a low residence time are maintained in converting ethylene into ethylene oxide"; justify the statement. [(4+2)+2]

2.(ii) Mention typical operating conditions in hydration of ethylene for production of ethanol using phosphoric acid as catalyst. Why do low temperature and high pressure favor the yield of ethanol? [6+2]

3.(i) Write brief note on (a) Disproportionation of Toluene (b) Transalkylation of C₉+ aromatic fraction. [4+4]

3.(ii) Elucidate the production of (a) ethyl benzene and (b) cumene through alkylation of benzene with ethylene and propylene respectively mentioning pertinent reactions, typical catalysts and process conditions employed (*process flow diagram not required*).

(c) What is the role of steam in dehydrogenation of ethyl benzene? [(3+3)+2]

4.(i) What are the process conditions and catalyst employed in conversion of o-xylene to Phthalic Anhydride in a typical tubular packed bed reactor? Use a simplified process flow diagram to describe the production. Explain the role of the 'switch condenser' deployed in the unit. [6+2]

4. (ii) What do you mean by Zeigler Natta catalyst?(b) Why is it better to wash polymer by alcohol instead of water?(c) What is 'melt flow index'? [4+2 +2]

BACHELOR OF CHEMICAL ENGINEERING EXAMINATION, 2017 (OLD)

(3rd Year, 1st Semester)

CHEMICAL TECHNOLOGY II

Time: Three hours

Full Marks: 100
(50 marks for each part)

Use a separate Answer-script for each part

Part II

Answer any five questions

5×10

1. With the help of a neat sketch discuss the atmospheric distillation section of a petroleum refinery (starting from crude coming from Tank Farm).
2. With the help of a neat sketch discuss the FCC unit (consisting of Reactor, Regenerator and Distillation column) of a petroleum refinery.
3. With the help of a neat sketch discuss the Fat Splitting process to produce soap and pure white glycerin.
4. Briefly discuss the Kraft pulping process (including the chemicals recovery section). Flowsheet not needed.
5. Briefly discuss how sugar crystals are produced from sugar cane. Flowsheet not needed.
6. Briefly discuss the leather making process from animal skins or hides (Flowsheet not needed).