Ref. No.: Ex/ChE/T/324/2017

B. Chemical Engineering (3rd Year 2nd Semester) Examination, 2017

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 the production of vinyl acetate monomer using a process flow diagram mentioning the reactions, heterogeneous catalysts used and operating conditions maintained . Mention the drawbacks of homogeneous catalytic process in this context. **[9]**

1. (ii) Briefly describe the production of methanol mentioning the reactions, catalysts used, operating conditions using natural gas feedstock (Use process flow diagram). **[9]**

2.(i) Write the reactions, catalysts used, operating conditions pertaining to production of 2-ethylhexanol using propylene and synthesis gas as feedstock. **[8]**

2.(ii) Mention typical operating conditions used in the furnace in thermal cracking of naphtha. Define KSF and show its effects on product yields. **[4+4]**

3.(i) What are the objectives of hydrotreatment of petrochemical feedstocks bearing sulfur, nitrogen and oxygen impurities? Describe a typical hydrotreatment process using a simplified process flow diagram mentioning the pertinent major reactions and operating conditions employed. **[4+8]**

[Turn over

3.(ii) Mono-ethanolamine can be produced from ethylene oxide and ammonia. Two principal secondary reactions occur to form di-ethanoamine and tri-ethanolamine. Mono-ethanolamine is more valuable than both the di and triethanolamines. Explain the effect of presence of excess ammonia in the reactor on the primary and secondary reactions. **[4]**

4.(i) Elucidate "Auto-acceleration" (Gel Effect) behaviour in free radical polymerization systems.

(ii) Briefly describe Polyethylene Production through Ziegler Process mentioning the process conditions using a process flow diagram.

(iii) What is critical micelle concentration pertaining to Emulsion polymerization for PVC production? Explain in view of emulsion polymerization. **[4+8+4]**

5. (i) Briefly describe the Halcon Process for production of Aniline from phenol using a simplified process flow diagram.

5. (ii) Briefly discuss the butane dehydrogenation process using Fluidized bed Reactor.

[8 +8]

EX/CHE/T/324/2017

BACHELOR OF CHEMICAL ENGINEERING EXAMINATION, 2017

(3rd Year, 2nd 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 ten*** questions 10×5

1. Explosive concerns with compressed natural gas used in vehicles are almost non-existent. Why?

2. The flame temperature in a tubestill heater is to the tune of 1400°C and the stack top temperature is around 120°C, discuss how the temperature gets reduced step by step.

3. Steam is deliberately fed into a hydrocarbon distillation tower. Why?

4. No hydrocarbon vapour enters into the steam jet ejector system at the top of vacuum distillation tower. How this is accomplished?

5. Comment on the statement 'Coking is a severe method of thermal cracking.'

6. Carbon monoxide is allowed to be produced in FCC regenerator but it is never released to the atmosphere. Comment.

7. Hydrogen is split-fed into the hydrocracker beds. Why?

8. Hydrogen is a by-product of catalytic reforming unit of a petroleum refinery, yet it is deliberately added along with the hydrocarbon feed. Why?

9. Rayon fibers are manufactured through wet spinning. How?

10. What are fats and oils? How is it 'split'? What are the products obtained thereby?

11. Briefly discuss the steps the hides are subjected to before being soaked in tannin solution.