Q. P. Code : 24262

Time – 3 hrs **Marks -80**

N.B – Question no 1 is compulsory.
Solve any three questions from remaining five questions.
Draw flow sheets and diagrams wherever necessary.

Q.1	a)	List all unit operations and unit processes in manufacture of phenol by Cumene process.	**4**
	b)	Explain how and why Isomerization of xylene is carried out?	**6**
	c)	What are the major engineering problems in manufacture of urea?	**6**
	d)	What are the constituent of commercial dye?	**4**
Q.2	a)	Describe DCDA process for sulfuric acid manufacture from elemental sulphur along with flow sheet with reference to :- Why multistage reactor used? Why interpass absorption done? How energy conservation achieved? What are typical process conditions? Why SO_3 is absorbed in 98% H_2SO_4 and not in water? What is the typical SO_2 conservation achieved and composition of tail gas?	**14**
Q.2	b)	Discuss thermodynamics and kinetics involved in nitric acid process along with reactions. What are the desirable and undesirable side reactions? Are there any ways to reduce undesirable reactions?	**6**
Q.3	a)	Describe the manufacturing process of caustic soda by electrolytic process. Why mercury cell is discontinued?	**10**
	b)	Explain base catalyzed trans-esterification reaction with manufacturing process of biodiesel.	**10**
Q.4	a)	What is catalytic cracking? Mention it's types. Discuss in detail Fluid catalytic cracking with neat diagram. Discuss the composition of products obtained, temperature and pressure conditions and catalysts employed.	**10**
	b)	Why LLDPE is replacing LDPE in most applications? Explain with process flow diagram the manufacturing process of HDPE.	**10**
Q.5	a)	Describe manufacturing process of styrene starting from ethyl benzene. What are the major engineering problems associated with the process? How will you produce 99.8% pure styrene.	**10**
	b)	Describe the manufacture of Cumene by SPA process.	**06**
		What is Cumax process?	**02**
		What are the advantages of Cumax process over SPA process?	**02**
Q.6		Write short notes on :	**20**
	a)	Manufacture of Ethanol from molasses.	
	b)	Agrochemical industry in India.	
	c)	Xylene separation along with flow sheet	
	d)	Importance of Naphtha reforming for chemical industry.	
