Note: Answer Five questions, Q1 must be answered.

Q1/
A) Explain in details the polymer dissolving process in closed system, and indirect heating. (8 marks)
B) Poly(benzylglutamate), PBLG, is a common polymer. Its partial specific volume is 0.791 ml/g and it dissolves in N,N'-dimethylformamide, DMF, which has a density of 0.944 g/ml (at typical room temperatures, this is close). Compute $c_2, \phi_2$, and $w_2$ if 0.03925 g of PBLG are added to 0.15 ml of DMF. (12 marks)

Q2/
A) What are the typical feedstocks to petrochemical processes include? (5 marks)
B) Sketch, describe the following units, and give an application in a petrochemical process.
   (Scrubber, Stripper, Flashing, Distillation, and Quencher) (15 marks)

Q3/ Vinyl chloride is produced in a two step process, state them, explain in details the second step, and sketch complete block diagram. (20 marks)

Q4/
A) Discuss the time required to dissolve the polymer, and explain how to reduce dissolving time. (10 marks)
B) Why must be careful to maintain the temperature closely when making solutions. (10 marks)

Q5/ Answer four of the following questions:
1. When the reactions are highly exothermic, why is the feed pre-heated?
2. What type of process design is expected for the air preheater?
3. In Chloromethanes process, why water is removed using the dryer?
4. Why ethylene dichloride is dried before entering the cracking furnace?
5. In Ethanolamines production, discuss why ammonia + water needs to be separated from the second tower i.e., water separation tower? (20 marks)

Q6/ Explain in details the polymerization techniques. Showing advantage and disadvantage of each methods. (20 marks)

Good Luck