

**Set 1:- kiadva**

1. Define the following terms: extraction, filtration, catalysis, biomass, yield. (15 points)
2. Draw a general process scheme of a supercritical fluid extraction process and write down typical operating conditions for the extraction step and for the precipitation/regeneration step (if this step is carried out by pressure reduction). (30 points)
3. List different non biological oxidation methods in wastewater treatment and their typical process parameters. (25 points)
4. The role of hexane in edible oil production. Describe the process in details. (30 points)

**Set 2: - kiadva**

1. Define the following terms in 2-3 sentences each: extraction, distillation, filtration, biological waste water purification, catalysis, biomass, yield, Reynolds-number, overall heat transfer coefficient, reaction enthalpy. (20 points)
2. a) Draw a phase diagram of CO<sub>2</sub> and indicate the critical data. (10 points)  
b) Fill in a table with the following phrases: density, diffusion coefficient, dynamic viscosity, gas, high, high, high, high, liquid, low, low, low, low, medium, supercritical fluid. (10 points)
3. Wheat straw can be hydrolyzed in supercritical water. What are typical conditions and which parameters influence the reaction? (20 points)
4. Water as solvent in industry. Discuss its advantages and disadvantages by showing examples. (30 points)

**Set 3:- kiadva**

- 1) Define the following terms in 2-3 sentences each: extraction, distillation, absorption, biological waste water purification, catalysis, biomass, yield, Reynolds-number, overall heat transfer coefficient, reaction rate. (20 points)
- 2) Describe the industrial decaffeination process. (20 points)
- 3) What is Wet Air Oxidation? List typical process parameters and name the reaction products. How could the reactions be enhanced? (20 points)
- 4) compare homogenous and heterogenous catalysis (advantages and disadvantages). Give and shortly describe industrial processes for both. (40 points)

**Set 4:**

- 1) Define the following terms in 2-3 sentences each and draw a typical equipment of the process. Explain how it works: extraction, distillation, absorption, filtration, sedimentation. (40 points)
- 2) List the process parameters which influence SF extraction from solids and explain their influence shortly. (20 points)
- 3) What is membrane fouling? What are the negative effects on the membrane processes? How can membrane fouling be reduced? (15 points)
- 4) Non-oxidative waste water purification techniques. List the possibilities (at least 6), describe 2 in details. (15 points)

**Set 5: -kiadva**

- 1) Define the following terms: absorption, phase, heterogeneous reaction, 18-electron rule, yield. (15 points)
- 2) a) Write down at least three industrial commercial applications for the SF extraction from solids and describe them briefly. (20 points)  
b) Why are they economical competitive to normal solvent processes? (15 points)
- 3) List different pressure driven membrane technologies, give the application fields and explain their main differences. (30 points)
- 4) Catalysis in water: describe one example in details. (20 points)