414

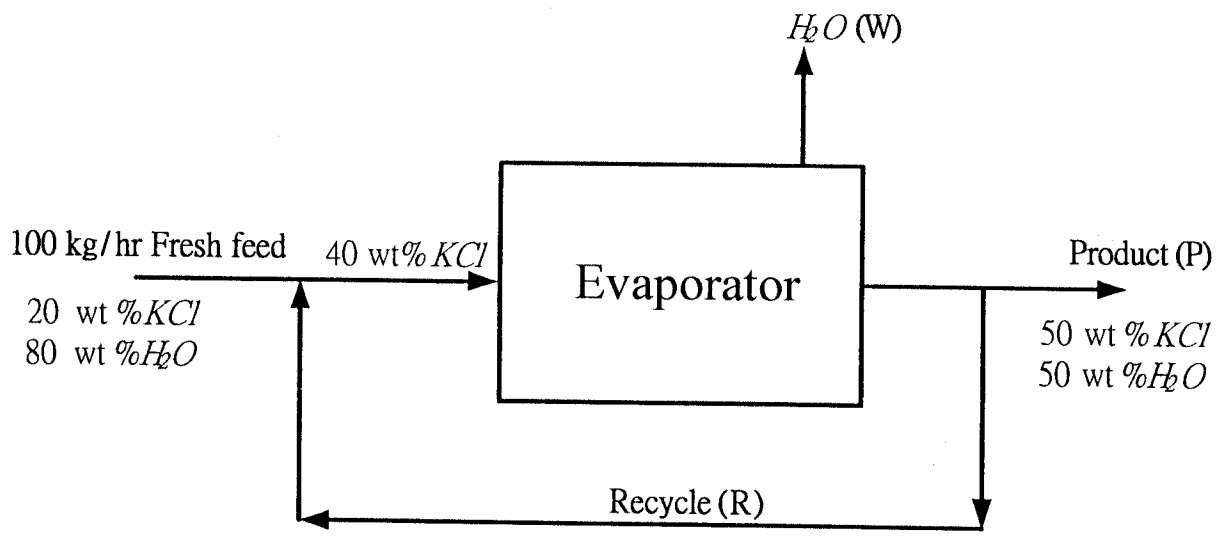
淡江大學 102 學年度日間部轉學生招生考試試題

系別：化學工程與材料工程學系三年級　科目：質 能 均 衡

考試日期：7 月 24 日(星期三) 第 5 節　　本試題共　4　大題，　1　頁

1. Answer the following questions: [5 pts for each question]
   (a) Can you use an alcohol thermometer to measure the temperature of a flame? Why?
   (b) Translate this statement "The fluid pressure must be the same at any points at the same height in a continuous fluid." in Chinese.
   (c) A process may be operated at steady state or transient state. What is the difference between these two operation states?
   (d) Can the density of a substance be directly measured? If not, how can you obtain the density of an unknown solid?
   (e) Ideal gas law shows that $PV = nRT$, where P: gas pressure, V: gas volume, n: number of moles of the gas, T: gas temperature, and R: gas constant. It was known that at standard conditions ($T = 0\ ^{o}C$ and $P = 1$ atm), ideal gas has a specific volume of 22.415 L/mol. What is the numerical value of R in psi·ft^3/(lb-mol·^{o}R)?
   (f) Is "***weight***" a basic dimension or a derived dimension? Is there any difference between "***weight***" and "***mass***"?

2. Find R and P in kg/hr. [25 pts]



3. Pure A in gas phase enters a reactor. 60 mol% of this A is converted to B through the reaction $A \rightarrow 3B$. What is the mole fraction of A in the exist stream? If the yield is defined as the number of moles of product formed per unit mole of the reactant consumed, what is the yield of B? [25 pts]

4. Estimate the minimum heat (in joule) required to raise the temperature of water in the container from 25 ^{o}C to 80 ^{o}C. The volume of water in the container is 2 liter. [20 pts]