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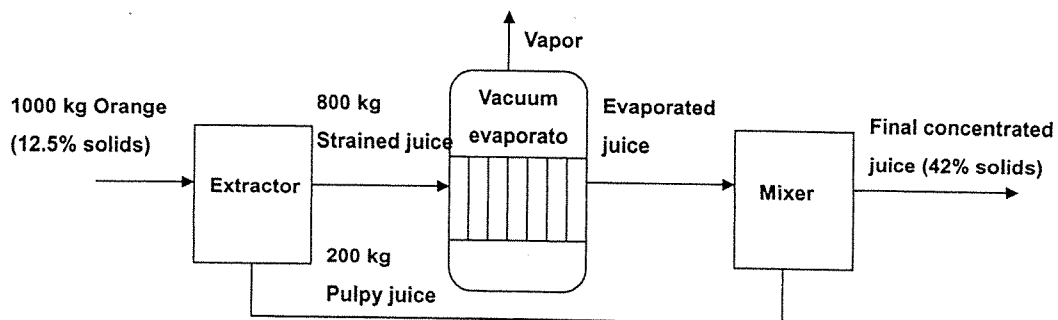科目：單元操作
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國立臺灣大學 104 學年度碩士班招生考試試題

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1. Please draw the following diagrams (25%)
   (a) Mollier diagram for steam (enthalpy/entropy diagram)
   (b) Pschrometric chart for air (humidity chart)

2. In a process for concentrating 1000 kg of freshly extracted orange juice containing 12.5% solids by weight, the juice is strained, yielding 800 kg of strained juice and 200 kg of pulpy juice. The strained juice is concentrated in a vacuum evaporator to give an evaporated juice of 58% solids. The 200 kg of pulpy juice is bypassed around the evaporator and mixed with the evaporated juice in a mixer to improve flavor. The final concentrated juice contains 42% solids by weight.

   Compute the following: (25%)
   (a) concentration of solids in the strained juice
   (b) quantity of final concentrated juice

3. Diced potatoes having 86% water by weight are dried in a convection dryer. 20 kg/min of diced potatoes enter along with 1200 kg/min of an air-water vapor mixture having a moisture content of 0.04%. The potatoes leave the dryer with 18% water content by weight. Determine the water content of the exiting air-water vapor mixture. (25%)

4. A refrigerated storage wall (3m * 6m) is constructed of 15 cm thick concrete (thermal conductivity = 1.37 $W/m°C$). Insulation must be provided to maintain a heat transfer rate through the wall at or below 500 W. If the thermal conductivity of the insulation is 0.04 $W/m°C$, compute the required thickness of insulation. The outside surface temperature of the wall is 38°C and the inside wall temperature is 5°C. (25%)

試題隨卷繳回