Assignment 2

Due on 2020-02-12, 23:59:59 IST.

The clue date for submitting this assignment has passed.

As per our guidelines you have not submitted this assignment.

Production of single-celled proteins from bacteria is described by the following reaction equation

\[ C_6H_{12}O_6 + 6H_2O \rightarrow 6C_2H_5OH + 6CO_2 + 6H_2 \]

where \( C_6H_{12}O_6 \) represents the biomass. If the respiratory quotient (RQ) is 0.8, determine the stoichiometric coefficients.

1. Value of \( x \) is __________
2. Value of \( y \) is __________
3. Value of \( z \) is __________
4. Value of \( a \) is __________
5. Value of \( b \) is __________
6. Value of \( c \) is __________

A local adhesive manufacturer is planning to market a new product. The amount of adhesive in the production is important to the application. The adhesive will be evaluated at an area of 3000 kgf of adhesive selected containing 10% polymer by weight. On mass-feeding of component C containing 10% resin and two large quantities of component D containing 5% resin and pure water, D, Calculate the weight of each that must be mixed together to fill this order. Use all of the 1% solution.

1. The weight of component A is __________ kg
2. The weight of component B is __________ kg
3. The weight of component C is __________ kg
4. The weight of component D is __________ kg

Figure 1 shows a schematic for making fresh water from sea water by heating. The pre-chilled sea water is evaporated into a vacuum at a low pressure. The evaporation rate is produced by a condenser and the condenser water comes from evaporation of the water during the condenser. The evaporation of water produces water vapor B, C, D, and E from the source. The pure salt-free water vapor is condensed and fed into a higher pressure where the heat of condensation of the condenser is removed through the heat at the other side of the sea water condenser. As a result, pure cold water and concentrated brine (C) leave the process as products.

1. The flow rate of stream A, if the feed to 1500 kg/hour
2. The flow rate of stream B, if the feed to 1500 kg/hour
3. The flow rate of stream C, if the feed to 1500 kg/hour
4. The flow rate of stream D, if the feed to 1500 kg/hour
5. The flow rate of stream E, if the feed to 1500 kg/hour

Diagram 1 (Figure number)