CS/B.Pharm/SUPPLE/SEM-7/PT-707/2010

2010
PHARMACEUTICAL ENGINEERING

Time Allotted : 3 Hours   Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

                                        $10 \times 1 = 10$

     i)   In distillations separation, q value of cold liquid feed is

           a) $q > 1$ b) $q = 0$

           c) $q = -\,\text{ve}$ d) $q < 1$.

     ii)   Plate towers, Packed towers and spray are related to

           a)   distillation   b)   extraction

           c)   dehumidification   d)   none of these.

     iii)   Murphree plate efficiency, $E = 100 \left[\left(y_n - y_{n+1} \right) / \left(y_n^* - y_{n+1} \right) \right]$

         is related to

           a)   size reduction   b)   distillation

           c)   size separation   d)   extraction.

SE-70   [Turn over

iv) Rate of drying is .... to humidity.

    a)   directly proportional

    b)   inversely proportional

    c)   not dependent on humidity

    d)   none of these.

v)   At dew point temperature, humidity is

    a)   0%   b)   50%

    c)   100%   d)   None of these.

vi) Rayleigh equation is used for the analysis of

    a)   simple batch distillation

    b)   fractional distillation

    c)   molecular distillation

    d)   azeotropic distillation.

vii) Sublimation is involved in

    a)   tray dryer

    b)   fluid bed dryer

    c)   tunnel dryer

    d)   freeze dryer.

viii) Drying involves is

    a)   man transfer   b)   heat transfer

    c)   both (a) and (b)   d)   none of these.

ix) Spray drying technique is suitable for

    a)   thermolabile substance

    b)   milk product

    c)   granular sample

    d)   none of these.
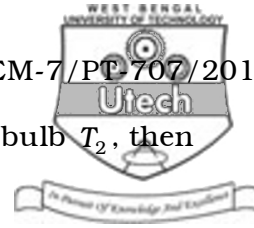
x) If dry bulb temperature is T_1 and wet bulb T_2, then

   a) $T_1 = T_2$

   b) $T_2 < T_1$

   c) $T_2 > T_1$

   d) $T_1 = 1 \cdot 39 \, T_2$.

xi) Drug agitator is the equipment used for the operation of

   a) mixing

   b) extraction

   c) size reduction

   d) humidification.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.   3 × 5 = 15

2. Write down a short note on Rotocel Extractor.

3. Describe dew point method for the determination of humidity.

4. What are the functions of the following components in Dorr agitator ?

   i)   Air pipe

   ii) Lifting chain

   iii) Revolving Launder

   iv) Blades.

5. A rotary dryer is used to dry 35,000 kg/hr of a wet drug containing 5% w/w of water to a water content of 0·2% w/w. Calculate the weight of water removed during drying operation.

SE-70   3   [Turn over

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following.   3 × 15 = 45

6. What is leaching ? What is the importance of extraction in pharmaceutical industry ? Describe briefly the operation of any continuous counter current-extractor with a neat sketch.

    2 + 5 + 8

7. What do you mean by azeotropic distillation ? Discuss the construction of a bul-cup column. Write a note on packed column used in separation of the bir-mixture. $2 + 6\frac{1}{2} + 6\frac{1}{2}$

8. a) What do you mean by drying ? Sketch a typical drying rate curve for a porous solid and explain the nature of the curve. What is critical moisture content ?

    b) With a neat sketch describe the working principle of a spray drier. What are the advantages of spray drier ?

    9 + 6

9. a) Discuss the construction of an agitated tower extractor.

    b) Define raffinate and half miscella.

    c) Write a note on rotocel extractor.   15

10. A solid is to be dried in batch operation under such conditions that the rate of drying during constant rate period is 45 kg of water removed per hour. The critical moisture content is 0·35 kg of water per kg of dry solid. Equilibrium material contains 600 kg of dry solid and 300 kg of water at start of drying. Estimate the drying time needed for constant rate period. Amount of dry solid = 600 kg.   15

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