

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
Comprehensive Examination (Close Book)
2023-24 SEM I Process Engineering BITS F219

Max. Marks: 40 Duration: 180 min Date:20/12/2023 Weightage: 40%

Start each answer on a new, fresh page of your answer sheet.

Q.1: State any two fundamental differences between convection and diffusion as a mechanism of mixing. Explain the role of sampling and statistics in determining the blend uniformity during the mixing process. [2+3=5]

Q 2: What is the difference between loss on drying and moisture content? Discuss any three advantages of spray dryer with proper justification. [2+3=5]

Q 3: How can absolute alcohol be obtained from a 95%v/v alcohol? Draw Boiling point-composition curve for cyclohexane and toluene showing three theoretical plates. Discuss the role of fractionating column in the separation of two liquids having very close boiling points. [1+1+3=5]

Q 4: Particle size distribution of a powder sample has been presented in the table 1. Calculate the cumulative percent and draw a cumulative distribution curve. What is the median size of the sample? [5]

Table 1: Particle size distribution data of a powder sample

Size range (mm)	No of particles in each interval
0-5	96
5-10	105
10-15	116
15-20	129
20-25	150
25-30	212
30-35	148
35-40	127
40-45	114
45-50	101
50-55	93
55-60	88

Q 5: Draw a compaction profile of a material which is perfectly elastic in nature. What is the significance of residual radial pressure during the compression cycle? What do you understand by lubrication efficiency and how can it be determined? What is the role of tablet-height to-diameter ratio in die-wall friction during compression?

[1+1+1+1+1=5]

Q 6: Explain the significance of hemispherical shape of the evaporating pan. Short-tube evaporators are suitable for evaporating large amounts of liquid as compared to evaporating still. Why? Explain the mechanism of the rise of liquid in a long-tube

evaporator during evaporation. State any four differences between evaporating still and film evaporator. [1+1 +1+2=5]

Q 7: Write any two fundamental differences between maceration and percolation. In laboratory set up, separating funnel is not able to extract complete drug in a liquid-liquid extraction process. Why? Explain the principle of Podbielniak Extractor. [2+1+2=5]

Q 8: Why are filtration rate decreases over the period during vacuum filtration? Describe any one industrial vacuum filter. Which industrial filter is used for the removal of mycelium after antibiotic production by fermentation? [2+2+1=5]
