

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
Comprehensive Examination (Closed Book)
2022-23 SEM I Process Engineering BITS F219

Max. Marks: 40 Duration: 180 min Date:21/12/2022 Weightage: 40%

Q.1: Draw a representative plot of the degree of mixing vs time. What does the slope of the curve indicate? Which factors determine the initial resistance in the mixing? Why is an additional shear force required to mix fine materials and how can it be provided?
[1+1+1 +1+1=5]

Q 2: Define dew point. What is the significance of dew point in the drying of solids? Why does the drying rate start decreasing during the falling rate period and what is the difference between the first and second falling rate periods? Describe any four factors affecting the fluid bed drying process.
[1+1+1 +1+1=5]

Q 3: How can absolute alcohol be obtained from a 95%v/v alcohol? During the separation of a binary mixture of miscible liquids, the vapour is richer in the more volatile component than the liquid with which it is in equilibrium. Justify the statement. What is extractive distillation? Explain it with a suitable example.
[1+2 +1+1=5]

Q 4: State **any four** limitations of 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. How to concentrate a nonvolatile component in a high-boiling point medium?
[1+1 +1+2=5]

Q 5: Describe the factors which affect the choice of an extraction method. Explain the factors affecting the rate of leaching during extraction. Describe the multi-stage extraction process in detail and state its advantages over other processes.
[1+1 +2+1=5]

Q 6: Describe the effect of the following factors on the filtration rate of a concentrated slurry, a) Pressure, b) Viscosity, c) filter area and d) cake permeability. Describe **any one** constant pressure filtration process. State **any two** differences between vacuum filtration and pressure filtration.
[2+1+2=5]

Q 7: Describe different theories propose for milling efficiency. Explain **any four** factors which affect milling using a ball mill. Suggest a mill which can be used to produce very fine particles.
[2 +2+1=5]

Q 8: 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]
