DEPARTMENT OF PHARMACEUTICAL SCIENCES & TECHNOLOGY

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(Internal Assessment I)

CLASS: BPHARM **SEMESTER: III**
BRANCH: PHARMACY **SESSION: MO 2024**
SUBJECT: BP304T PHARMCEUTICAL ENGINEERING
TIME:2.00 Hour **FULL MARK: 30**

PART I

A. Objective type questions (Answer all questions) (5 x02=10 marks)

1. Write down the dimension of pressure and kinematic viscosity. CO1 & CO2 (BL1 & BL2)
2. In case of free settling, write down the formula to calculate the terminal settling velocity in transition flow region? CO1 & CO2 (BL1 & BL2)
3. If a suspension contains 860 g of solid material in 1520 cu cm of total volume, then calculate the volume fraction voids in suspension when the density of solid material is 800 kg/cu m. CO3 & CO4 (BL3 & BL4)
4. Convert the value of overall heat transfer coefficient 1600 Cal/hr.cm^2.˚C to ……. Watt/m^2.˚F CO1 & CO2 (BL1 & BL2)
5. Calculate the critical speed in m/s of a ball mill (diameter = 300 cm) loaded with 50 mm balls. CO3 & CO4 (BL3 & BL4)

PART II

B. Long Answers (Answer any one out of two) (01x10=10 marks)

1. It is desired to separate quartz particles from galena particles by taking advantage of their different specific gravities. A hydraulic classifier is employed under free-settling conditions. Separation is to be carried out in water at 20°C. The specific gravity of quartz is 2.4 and that of galena 10.20. The original mixture of particles has a size range from 0.00025 to 0.00225 cm. It is found that three fractions are obtained, one of quartz only, one of galena only, and one of a mixture of quartz and galena. What are the size ranges of two substances in three different fractions? CO4 & CO5 (BL5 & BL6)
2. Calculate the settling velocity for the hindered settling of glass spheres at 20 °C when the suspension contains 1450 g of glass spheres in 1340 cu cm of total volume. The average diameter of the spheres, as determined from photomicrographs, was 0.0001905 m, and the true density of the spheres was 2803 kg/cu m. The viscosity of liquid at 20 °C was 0.08 Pascal Sec. CO4 & CO5 (BL5 & BL6)

PART III

C. Short Answers (Answer any two out of three) (02x05=10 marks)

1. Derive Bernoulli's equation for incompressible fluid flowing through a circular pipe. CO3 & CO4 (BL4 & BL5)
2. Determine the mass flow rate of a liquid by Venturi meter. CO3 & CO4 (BL4 & BL5)
3. Do the dimension analysis of $\Delta p = f(D, L, U, \rho, \mu)$ CO3 & CO4 (BL4 & BL5)

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