

DEPARTMENT OF PHARMACEUTICAL SCIENCES & TECHNOLOGY

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

CLASS: BPHARM		SEMESTER: III
BRANCH: PHARMACY		SESSION: MO 2025
SUBJECT: BP304T PHARMCEUTICAL ENGINEERING		
TIME: 2.00 Hour		FULL MARK: 30

PART I

A. Objective type questions (Answer all questions)	(5 x 02=10 marks)
1. Write down the dimension of viscosity and establish the relation between Poise and PaS.	CO1 & CO2 (BL1 & BL2)
2. Write down the operating condition of ball mill at critical condition so that the ball mill runs smoothly.	CO1 & CO2 (BL1 & BL2)
3. If the coefficient of friction is 0.26, calculate the angle (angle of nip) between two opposing rollers in a crushing or compaction machine.	CO3 & CO4 (BL3 & BL4)
4. Convert the value of overall heat transfer coefficient 2250 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 = 100 cm) loaded with 100 mm balls.	CO3 & CO4 (BL3 & BL4)

PART II

B. Long Answers (Answer any one out of two)	(01x10=10 marks)
1. In the equipment shown below, a pump draws a solution of specific gravity 3.5 from a storage tank through schedule 40 steel pipe as per the dimension given in the figure. The velocity in the suction line is 1.125 m/s. The end of the discharge pipe is 30 m above the level of the solution in the feed tank. Friction losses in the entire piping system are 120 J/kg. What pressure must the pump develop? What is the power delivered to the fluid by the pump?	
	CO4 & CO5 (BL5 & BL6)
2. An orifice meter with flange tap is to be installed in a 150 mm line to measure the flow of water. The maximum flow rate is expected to be 65 m ³ /h at 15°C. The manometer used to measure the differential pressure is to be filled with a manometer fluid ($\rho = 12.8 \text{ g/cm}^3$) and water is to fill the leads above the surface of the manometer fluid. The water temperature will be at 15°C throughout. If the maximum manometer reading is to be 135 cm, what diameter to nearest millimetre, should be specified for the orifice.	CO4 & CO5 (BL5 & BL6)

PART III

C. Short Answers (Answer any two out of three)	(02x05=10 marks)
1. Derive the equation by stating the proper assumptions to measure the pressure drop by using differential manometer.	CO3 & CO4 (BL4 & BL5)
2. Derive Stokes' law to measure the terminal settling velocity of spherical small particles falling through a viscous fluid under gravity.	CO3 & CO4 (BL4 & BL5)
3. Do the dimension analysis of $\Delta p = f(\rho, \mu, U, D, L)$	CO3 & CO4 (BL4 & BL5)