Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

B. Pharmacy Sem-I Remedial examination March 2009

Subject code: 210004

Subject Name: Pharmaceutical Engineering

Date: 17 / 03 /2009 **Time: 02:30pm-5:30pm**

Total Marks: 80

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Draw well labeled diagrams, wherever necessary**

Q.1

(a)	Define stoichiometry. Give significance of "stoichiometry" in pharmacy field	**03**
(b)	Define the following terms: (i) Unit operations (ii) Dimensional equation (iii) Tie substance.	**03**
(c)	Paper is passing continuously through a tunnel drier. The entering paper contains 0.1 lb water/Lb dry paper and the leaving paper contains 0.02 lb water/lb dry paper. How many pounds of water is evaporated per hour if 1000 lb/hr of paper enters the drier ?	**03**
(d)	Write a short note on Glass as a material for plant construction.	**03**
(e)	100 lb of wet air containing 0.1 lb water vapour/lb dry air is mixed with 50 lb of another wet air containing 0.02 lb water vapour/lb dry air. Calculate the pounds of water vapour per lb of dry air in the final mixture.	**04**

Q.2

(a)	Explain heat transfer by "conduction". Derive the equation for the rate of heat transfer when the resistance are in series.	**05**
(b)	Write a short note on Black body and explain Stephen Boltzmann law for black body.	**04**
(c)	The temperature of the inside of the oven is 420^0F. The inside wall of the oven is of brick, which is 8 inch thick and thermal conductivity is 2.2 BTU/hr.ft^2. ^{0}F/ft. The outside of the oven is covered with a 3-inch asbestos. The thermal conductivity of asbestos taken as 0.11 BTU/hr.ft^2. ^{0}F/ft. The outside insulation has a temperature of 100^0F. Calculate the heat lost through 2 ft^2 of wall area in 3 hr	**04**
(d)	Write a short note on Steam as a heating medium	**03**

Q.3

(a)	Define (i) Fluid Flow (ii) Streamline flow (iii) Turbulent flow	**03**
(b)	Give importance of study of fluid flow in pharmacy.	**03**
(c)	Give Reynold's equation and mention significance of Reynold's number.	**03**

	(d)	A fluid is flowing at a rate of 6 ft^3/min through a pipe having inside diameter of 0.167 ft. Density of fluid is 30 lb/ft^3 and viscosity of fluid is 0.002 lb/s.ft. Calculate (i) Average linear velocity. (ii) Reynold's number (iii) Report the type of flow	**07**
Q.4			
	(a)	Discuss how Bernoulli's theorem is used to derive an equation to measure flow rate using venturimeter	**07**
	(b)	Differentiate venturimeter and orifice meter.	**04**
	(c)	A mercury manometer is attached across up stream and orifice plate concentrically placed in a pipe. Water (ρ = 1.0 g/cc) flows inside the pipe. Manometer reading is 15 cm Hg (ρ_{Hg} = 13.6 g/cc). Calculate pressure difference ΔP in terms of g/cm^2. If instead of mercury manometer, carbon tetrachloride (ρ = 1.6 g/cc) manometer is attached, what will be manometer reading?	**05**
Q.5		Answer ***(Any FOUR)*** of the following	**16**
	(a)	Discuss in detail about the various types of Heat exchangers	
	(b)	Give the importance of pharmaceutical engineering in the field of pharmacy	
	(c)	Discuss the various methods for the prevention of corrosion	
	(d)	Write a short note on Rotameter	
	(e)	Discuss the various factors affecting selection of material of plant construction	
Q. 6			
	(a)	Write a note on various Rotary positive displacement pumps	**07**
	(b)	Explain corrosion and give the classification of types of corrosion	**04**
	(c)	Discuss in brief about the various modes of transportation used for solid materials	**05**
Q.7		Write short note on ***(Any FOUR)***	**16**
	(a)	Various equations used to calculate the loss of mechanical energy due to friction	
	(b)	Steam traps.	
	(c)	Gas laws	
	(d)	Influence of mass transfer on unit operations	
	(e)	Film co-efficient.	

****