Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. Pharm. – SEMESTER – III • EXAMINATION – WINTER • 2015

Subject Code: 2230002 **Date: 01-01-2016**

Subject Name: Pharmaceutical Engineering

Time: 10:30 am - 01:30 pm **Total Marks: 80**

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Define: (i) Absolute pressure (ii) Gauge pressure (iii) Calorie (iv) British thermal unit (v) Absolute Zero temperature (vi) Material balance	**06**
	(b)	Discuss dimensional analysis, its advantages and disadvantages.	**05**
	(c)	Define: Unit operation and Unit process. What are significances of studying Pharmaceutical engineering?	**05**
Q.2	**(a)**	Discuss Dalton's law, Amagat's law and their corollary.	**06**
	(b)	Explain in detail about the Heating values and Excess Air.	**05**
	(c)	A mixture containing 30% by weight HNO_3 , 40% by weight H_2SO_4 ,and 30% by weight water is to be made continuously by mixing concentrated H_2SO_4 (98% wt % H_2SO_4 and 2% H_2O), concentrated HNO_3 (90wt % HNO_3 and 10% H_2O) , and waste acid(20%wt H_2SO_4 ,5% H_2O and 5% HNO_3).Calculate the kilograms of concentrated H_2SO_4, concentrated HNO_3 and waste acid necessary per 1000 kg of final mixture.	**05**
Q.3	**(a)**	What is the principle of working of Rota meters? Give their general design and working.	**06**
	(b)	Classify flow meters. Write a note on any one of them.	**05**
	(c)	What is Reynolds number? Show how it is dimensionless. What is its significance in fluid flow?	**05**
Q.4	**(a)**	Write down in detail about different methods of heat transfer.	**06**
	(b)	What is black body? Explain about the Stefan-Boltzmann law for black bodies.	**05**
	(c)	A glass window with an area of 1 m^2 is installed in a wooden wall of a room. The dimensions of the wall are 3 m by 6 m. The wood is 2.54 cm thick and has a thermal conductivity of 0.15 J/(s)(m^2)(K/m).The glass is 0.42 cm thick and has thermal conductivity of 0.69 J/(s)(m^2)(K/m).If the inside wall and glass temperature is 30°C, calculate the total amount of heat conducted through the wall and glass as joules per hour.	**05**
Q.5	**(a)**	What is a valve? What are its basic components? With a neat and clean diagram describe globe valve.	**06**
	(b)	Explain in detail about store design of Pharmaceutical industry.	**05**
	(c)	Describe Belt conveyer.	**05**
Q. 6	**(a)**	Explain about molecular diffusion in gases and in liquid.	**06**
	(b)	Classify heat exchange equipments. Discuss construction and working of single pass tubular heat exchanger.	**05**
	(c)	Explain about the principle involved in Mass transfer. Enlists unit operations in which mass transfer operation is involved.	**05**
Q.7	**(a)**	Discuss various factors affecting selection of material of Pharmaceutical plant construction.	**06**
	(b)	Define corrosion. Write a note on factors affecting the corrosion.	**05**
	(c)	Explain in detail about the reciprocating pumps.	**05**

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