Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER 2013

Subject Code: 150505 Date: 09-12-2013

Subject Name: Fundamentals of Chemical Engineering Unit Operations

Time: 10.30 am - 01.00 pm Total Marks: 70

Instructions:

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

Q.1	**(a)**	Explain Bernoullis equation for the flow of an incompressible fluid through a pipe. List the assumptions involved and the correction factors.	**07**
	(b)	Explain the construction and working of a double pipe heat exchanger with a diagram.	**07**
Q.2	**(a)**	Classify the different size reduction techniques and list the major equipments in each category.	**07**
	(b)	Explain the working principle of an orificemeter with a neat sketch. Write the major equation.	**07**
		OR	
	(b)	Differentiate between a pipe and tube. Briefly discuss criteria for pipe sizing and pipe joints.	**07**
Q.3	**(a)**	Categorize different types of pumps and describe in detail any one of them.	**07**
	(b)	Explain principle of cake filtration and briefly describe different types of filters used in industry.	**07**
		OR	
Q.3	**(a)**	Write short notes on: i) ball mill and ii) hydrocyclone.	**08**
	(b)	Explain the construction and working principle of a jaw crusher.	**06**
Q.4	**(a)**	Describe different types of commercially used evaporators in brief.	**08**
	(b)	Write short notes on: i) natural convection and ii) LMTD	**06**
		OR	
Q.4	**(a)**	Define: i) Stefan Boltzmann law and ii) Kirchoff's law	**08**
	(b)	Explain heat transfer by conduction and Fouriers law.	**06**
Q.5	**(a)**	Explain distillation process and relative volatility. Explain the working of a distillation column with a detailed schematic representation.	**07**
	(b)	Describe liquid-liquid extraction process and criteria for selection of solvent.	**07**
		OR	
Q.5	**(a)**	Explain crystallization process and describe different types of crystallizers in brief.	**07**
	(b)	Explain the construction and working of a tray drier with a neat diagram.	**07**

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