Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 711002N **Date: 09-01-2013**

Subject Name: Vacuum Engineering

Time: 02.30 pm – 05.00 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)**	Classify vacuum gauges based on their operating principle and state the range of operation and general application of the same.	**07**
	(b)	Define speed of exhaust, pumping speed and conductance of a vacuum system. Derive the fundamental equation of vacuum system connecting speed of exhaust, pump speed and pipe work conductance. Give your remarks pertaining to the equation derived.	**07**
Q.2	**(a)**	Classify vacuum pump based on the principle of operation. State their operating limits of pressure and applications.	**07**
	(b)	Explain construction, working, limitations and applications of water ring vacuum pump with neat sketch.	**07**
		OR	
	(b)	With neat sketch explain the construction and working of roots blower pump and hence state why it is always built with an internal backing pump.	**07**
Q.3	**(a)**	With neat sketch explain the construction, operation and application of sorption pump.	**07**
	(b)	Write short note on cryogenic pump.	**07**
		OR	
Q.3	**(a)**	Write short note on cold cathode getter ion pump.	**07**
	(b)	With neat sketch explain working principle, operation, and construction of Mass spectrometer Leak Detection.	**07**
Q.4	**(a)**	Explain vacuum application in thin film coating and freeze drying.	**07**
	(b)	Discuss metallic and non-metallic materials for vacuum application.	**07**
		OR	
Q.4	**(a)**	Write note on Space simulation chamber.	**07**
Q.4	**(b)**	Write exhaustive note on vacuum valves.	**07**
Q.5	**(a)**	With neat sketch explain working principle, construction and application of hot cathode ionization gauge.	**07**
	(b)	Explain with neat sketch the construction of baffle and trap. State hoe a baffle differs from a trap.	**07**
		OR	
Q.5	**(a)**	With neat sketch explain working principle, construction and application of cold cathode ionization gauge.	**07**
	(b)	Write note on matching pumps operating in (i) series (ii) parallel	**07**

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