

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 how 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**
