

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013****Subject code: 711002N****Date: 04-06-2013****Subject Name: Vacuum Engineering****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)** What do you mean by vacuum? How does it differ from the pressure? Classify the vacuum pump on their working pressure ranges. Also mention their applications. **07**
- (b)** Classify the vacuum gauges based on their operating principle and state the range of operation and general application of the same. **07**
- Q-2 (a)** With neat sketch explain the construction, working and application of water ring pump. **07**
- (b)** Define and explain the following. **07**
(i) Fore vacuum (ii) Maximum permissible start up pressure (iii) Maximum tolerable discharge pressure (iv) Ultimate pressure (v) Through put.
- OR**
- (b)** What is resistance, and conductance in vacuum pipe work? Also define speed of exhaust and pumping speed. Discuss the basic theory of pumping. **07**
- Q-3 (a)** Describe with neat sketch how a two stage rotary vacuum pump works. Discuss the properties of working fluids for oil sealed pumps. **07**
- (b)** Write note on sorption pump **07**
- OR**
- Q-3 (a)** Write note on turbomolecular pump. **07**
- (b)** Explain with neat sketch construction and working of fractioning type oil-vapor diffusion pump. Also explain back streaming and back migration. **07**
- Q-4 (a)** Explain with neat sketch the construction, working and principle of hot cathode ionization gauge. **07**
- (b)** Briefly discuss the principle of operation of thermal conductivity gauges. Discuss the factors which limit its upper and lower values of measurements. **07**
- OR**
- Q-4 (a)** Discuss vacuum application in thin film coating. **07**
- (b)** Discuss the applications of Ceramics and polymers in vacuum system **07**
- Q-5 (a)** Explain the selection criteria of demountable vacuum joints for vacuum system. Also discuss the requirements of vacuum valve in system. **07**
- (b)** Write note on Mass Spectrometer Leak Detection. **07**
- OR**
- Q-5 (a)** Write note on space simulation chamber. **07**
- (b)** Discuss the basic requirements of material as vacuum materials. Also discuss metallic materials for vacuum applications. **07**
