

**GUJARAT TECHNOLOGICAL UNIVERSITY****M.E Sem-I Regular Examination January / February 2011****Subject code: 711002N****Subject Name: Vacuum Engineering****Date: 01 /02 /2011****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) What do you mean by speed of exhaust, pump speed, and pumping speed? **07**  
Give your answer with clear concept in context of vacuum system.
- (b) Explain resistance and conductance of an arbitrary vacuum pipe work. Also **07**  
derived the fundamental equation of the vacuum system. Give your reason  
why is it called as fundamental equation?
- Q.2** (a) Define and explain-(i) Rough or fore vacuum (ii) Maximum permissible **07**  
start up pressure (iii) Ultimate pressure
- (b) With the help of a neat sketch explain the working of a diffusion pump. **07**  
Which types of properties of oil are to be desired in such pump?
- OR**
- (b) Write note on roots blower vacuum pump. **07**
- Q.3** (a) Describe with neat sketch the working and construction of water ring **07**  
pump. State its applications and also its limitations.
- (b) Write note on turbomolecular pump. **07**
- OR**
- Q.3** (a) What is vacuum and domain of vacuum? Give classification of vacuum **07**  
pump with their working pressure range and applications.
- (b) Write a note on cold cathode Getter iron pump. **07**
- Q.4** (a) Explain in detail about the use and care of vacuum gauges. **07**
- (b) Write note on mechanical vacuum gauges. **07**
- OR**
- Q.4** (a) Explain in brief the principle of operation of thermal conductivity gauges. **07**  
Discuss the factors which limit its upper and lower values of measurement  
of pressures.
- Q.4** (b) State the factor to be kept in mind to minimize leakage in a vacuum system **07**  
while at designing assembly and manufacturing stages. Explain leak  
hunting by fluorescent method.
- Q.5** (a) Write note on non-metallic material for vacuum application. **07**
- (b) Write note on Space Simulation Chambers. **07**
- OR**
- Q.5** (a) In which way vacuum valves are differed from the valves used at normal **07**  
pressure and temperature?
- (b) Which factors should be born in mind while selecting the design of a **07**  
demountable joint? Explain demountable joints using nonmetallic gaskets.