

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**DIPLOMA ENGINEERING – SEMESTER – • EXAMINATION – SUMMER-2015**

**Subject Code: 3351703****Date: 07/05/2015****Subject Name: Analytical Instrumentation****Time: 2:30 pm to 5:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make Suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of programmable & Communication aids are strictly prohibited.
5. Use of only simple calculator is permitted in Mathematics.

- Q.1** Answer any seven out of ten. **14**
1. Define analytical instrumentation.
  2. Define the term: Viscosity
  3. State the unit of viscosity
  4. Enlist types of density measurement techniques
  5. Define conductivity and state its unit
  6. Define pH
  7. List types of Polarography
  8. Define Absorption spectroscopy.
  9. State Lambert's law
  10. List basic parts of Gas chromatograph
- Q.2** (a) Explain importance of composition analysis in process industries **03**  
OR  
(a) State the methods of viscosity measurement techniques **03**  
(b) Draw block diagram of an analytical instrument **03**  
OR  
(b) Define density and specific gravity. **03**  
(c) List Application of composition analysis **04**  
OR  
(c) Explain principle of Saybolt 's viscometer **04**  
(d) Classify analytical instruments based on properties that are utilized in the analysis **04**  
OR  
(d) Describe pressure head type densitometer **04**
- Q.3** (a) State the limitations of refractometer **03**  
OR  
(a) List applications of refractometer **03**  
(b) Classify refractometer. **03**  
OR  
(b) Explain principle of NMR. **03**  
(c) Draw construction of X-ray diffraction scheme. **04**  
OR  
(c) Draw construction of X-ray absorption scheme **04**  
(d) Explain principle of X-ray diffraction scheme **04**  
OR  
(d) Explain principle X-ray absorption scheme **04**

- Q.4** (a) Define the terms: conductance and cell constant. **03**  
OR  
(a) Define Dissociation constant  $K_w$  and state pH range **03**  
(b) Draw and explain direct reading method of conductance measurement **04**  
OR  
(b) Explain working principle of conductivity cell **04**  
(c) Draw and explain null method of conductance measurement. **07**
- Q.5** (a) Draw and explain block diagram of a Gas chromatograph **04**  
(b) Explain theory of operation of refractometer **04**  
(c) Explain flame photo detector **03**  
(d) State Beer- Lambert's law **03**

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