Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VI • EXAMINATION – SUMMER • 2014**

**Subject Code: 161705** **Date: 26-05-2014**

**Subject Name: Instrumentation Measurement-II**

**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)** | Draw and describe high frequency type electrical conductivity measurement technique for aqueous solution. Obtain cell constant for it. | **07** |
| | **(b)** | Explain schematic, operation, limitation, benefits and application of piezo-electric transducer for force measurement. | **07** |
| **Q.2** | **(a)** | Draw and describe hot-wire $CO_2$ thermal conductivity meter with its limitation. List thermal conductivity units. | **07** |
| | **(b)** | Draw the functional block diagram of X-ray absorption spectroscopy and discuss the importance of each block in brief. | **07** |
| | | **OR** | |
| | **(b)** | Illustrate viscosity is one of the qualitative parameter in process instrumentation. Explain one of the suitable measuring techniques for liquid viscosity. | **07** |
| **Q.3** | **(a)** | Draw and describe Mass spectroscopy with its schematic, operation, limitation, benefits and application. | **07** |
| | **(b)** | List the moisture measurement technique. Explain conductivity technique for moisture measurement in textile and paper industry. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Write the basic principle of NMR and illustrate the schematic, operation, limitation, benefits and application of NMR type spectroscope. | **07** |
| | **(b)** | Draw and explain Op-Amp based direct reading pH meter with temperature compensation. | **07** |
| **Q.4** | **(a)** | Draw and describe paramagnetic Oxygen analyzer with its schematic, operation, limitation, benefits and application. | **07** |
| | **(b)** | Explain basic principle of UV and visible type absorption spectroscopy. Draw and describe any one with its schematic. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Draw and describe IR-based gas density meter with its schematic, operation, limitation, benefits and application. | **07** |
| | **(b)** | Explain Flame photometric detector (FPD) with its schematic, operation, limitation, benefits and application. | **07** |
| **Q.5** | **(a)** | Differentiate gas and liquid chromatography. Explain functional block diagram of gas chromatography. | **07** |
| | **(b)** | Define and draw ion-selective electrodes. Compare it with combined pH electrodes with engineering importance. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | What are the differences of ON line and OFF line analysis? Discuss about online sampling system. | **07** |
| | **(b)** | List the types of velocity sensor for vibration measurement and explain one of them in detail. | **07** |

**********