Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

FIFTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL)

END SEMESTER EXAMINATIONS, DEC 2016/JAN 2017

SUBJECT: ANALYTICAL INSTRUMENTATION [ICE-321]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

1A.	Derive Beer-Lambert law and explain chemical deviations of Beer- lambert law.	**5**
1B.	Explain different types of monochromators which are used in spectrophotometers.	**3**
1C.	The molar absorptivity of the iron (II)-2,2',2"-terpyridyl complex is $1.11*10^4$ at 522 nm. Calculate the concentration of the complex in a solution which has a percent transmittance of 36.5 at 522 nm in a cell with a path length of 1.00 cm.	**2**
2A.	Draw optical diagram for double beam UV and Visible spectrophotometry. Explain photomultiplier tube.	**4**
2B.	Explain the infrared spectrophotometer based on Attenuated Total Reflectance technique.	**4**
2C.	What is the role of atomizer in Flame photometers?	**2**
3A.	What is Chromatography? Briefly explain the working of High Pressure Liquid Chromatograph.	**5**
3B.	With neat diagram, explain atomic absorption spectrophotometer.	**3**
3C.	Explain principle of time of flight mass spectrometer.	**2**
4A.	Explain the technique used for the measurement of average spacing between rows of atoms.	**4**
4B.	Explain ion selective electrode which is used to measure silicon in a solution	**4**
4C.	With a neat diagram explain digital type pH meter.	**3**
5A.	Explain the rules for finding the net spin of a nucleus and with neat diagram explain continuous wave NMR Spectroscopy.	**5**
5B.	Name the method of oxygen measurement based on curie's law and explain its working.	**5**
6A.	With neat diagram, explain measurement of nitrogen using thermal conductivity analyzer.	**4**
6B.	Explain the measurement of Carbon monoxide in a gas using infrared radiations	**3**
6C.	Explain the detection of 'α' particle using any one of the crystal scintillator.	**3**