Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

FIFTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

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 any two types of radiation sources which are used in Ultraviolet spectrophotometer	**3**
1C.	A particular sample of solution of colored substance knows to follow Beer's law shows 80% transmittance when measured in a cuvette of 1.0 cm optical path length. i) Calculate the percent transmittance for solution of twice concentration in the same cuvette. ii) What must be the path length in a cuvette to same transmittance (80%) for a solution of twice the original concentration?	**2**
2A.	Draw optical diagram for double beam UV and Visible spectrophotometry. Explain photomultiplier tube.	**4**
2B.	With neat diagram, explain infrared spectrophotometer which uses encoding and decoding of different wavelength radiations	**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 flame emission spectrophotometer.	**3**
3C.	Explain principle of mass spectrometer.	**2**
4A.	Explain the procedure for generation of X- rays.	**4**
4B.	With a neat diagram, explain the oxygen analyzer which is used in medical field.	**3**
4C.	Explain the detection of β particle using any one of the liquid scintillator	**3**
5A.	Explain the rules for finding the net spin of a nucleus and with neat diagram explain	**5**

continuous wave NMR Spectroscopy.

5B.	Explain the principle of biosensors and explain the working of an optical biosensor	**5**
6A.	With neat diagram, explain measurement of ozone based on conductivity principle.	**4**
6B.	Explain the measurement of Carbon monoxide in a gas using infrared radiations	**3**
6C.	With a neat diagram explain chopper amplifier type PH meter.	**3**

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