Code No: **R42048** **R10** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

ANALYTICAL INSTRUMENTATION

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1	a)	Explain the importance of pH measurement in process industries and explain the process of pH measurement.	[8]
	b)	Explain the conductivity method for the measurement of SO2 in air sample.	[7]
2	a)	State and explain Beer lambert law. Explain the deviations of this law	[8]
	b)	Describe in detail, how galvanic method can be used to determine the Oxygen concentration in a gas.	[7]
3	a)	Explain in detail Electron capture detector used in the process of gas chromatography system with neat sketches.	[8]
	b)	Explain in carrier flow diagram and the operation of liquid chromatography with neat sketches.	[7]
4	a)	Write about the paramagnetic type detectors	[8]
	b)	Explain in detail sample injection system in chromatography.	[7]
5	a)	What are the various detectors normally used in UV/VIS spectrometers? Describe th construction and working of any one of them	[8]
	b)	Explain the advantages and disadvantages of single and double beam spectrometer?	[7]
6	a)	How is grating created? What is their specific feature and where is it used?	[8]
	b)	Briefly discuss about the detectors used for flame photometry.	[7]
7	a)	Explain the constructional details of NMR spectrometer	[8]
	b)	Brief discussion on electron spin resonance	[7]
8	a)	Describe the properties of α, β and γ particles in brief.	[8]
	b)	What are Counters? What for and why are these used in nuclear radiation measurements?	[7]

Code No:**R42048** **R10** **Set No. 2**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

ANALYTICAL INSTRUMENTATION

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

*****

1	a)	With schematic diagram explain the Chopper amplifier type pH meter.	[8]
	b)	Explain how the output potential of pH electrode is related to pH and also for H^+ ion concentration with equations.	[7]
2	a)	Explain the principle of operation of thermal conductivity analyser used for estimation of components such as CO, CO_2 etc.	[8]
	b)	With a neat block diagram explain any one type of sodium analyser.	[7]
3	a)	Explain in detail the sample injection system in chromatography.	[8]
	b)	Explain the operation of multichannel type instrument to calculate focal length of a monochromator.	[7]
4	a)	Sketch the components of gas chromatography.	[8]
	b)	Explain in detail photo Ionisation detector used in the process of gas chromatography.	[7]
5	a)	Discuss about the simple analytical procedures on given samples using Ultraviolet Spectrophotometers.	[8]
	b)	Explain in detail the optical filters used in spectrometry.	[7]
6	a)	Describe the basic difference between a spectrometer for absorption measurements and emission studies.	[8]
	b)	Briefly discuss about the detectors of flame photometry.	[7]
7	a)	Discuss the merits of various types of mass spectrometer.	[8]
	b)	Draw the schematic and explain the multi-channel spectrophotometer	[7]
8	a)	Explain the factors affecting the counting of pulses.	[8]
	b)	Discuss electromagnetic radiation, its properties and its interaction with matter in brief.	[7]

Code No:**R42048** **R10** **Set No. 3**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

ANALYTICAL INSTRUMENTATION

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1 a) With schematic diagram explain the vibrating condenser amplifier pH meter. [8]

b) Explain how the thermal conductivity of hydrogen different from other gas analysers. [7]

2 a) How can IR gas analyser be used to determine the components such as CO, CO2 and Nitric oxide of a given sample. [8]

b) Explain the construction details of sodium analyser. [7]

3 a) What are the various applications of gas chromatography and explain any one application in detail [8]

b) Describe in detail, how galvanic method can be used to determine oxygen concentration of a gas [7]

4 a) Explain the paramagnetic type detectors used in gas chromatography. [8]

b) Discuss the simple analytical procedures on given samples using Gas chromatographic methods. [7]

5 a) Differentiate photodiode array detector and diode array detector [8]

b) What is Non dispersive absorption type IR Technique-briefly explain. [7]

6 a) Explain the sources for Flame Photometers. [8]

b) By way of a schematic explain the operation of non-dispersive dual channel absorption technique of IR spectrometer [7]

7 a) Explain briefly about the atomic emission and absorption spectroscopy [8]

b) The order used in an echelle grating is 60 and the dispersion angle of 620, groove density 84/mm and the focal length of 0.6 m, obtain the reciprocal linear dispersion and resolution. [7]

8 a) What are the possible radiation methods with different interaction techniques? [8]

b) Explain the Industrial application of radiation measurement. [7]

Code No:**R42048** **R10** **Set No. 4**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

ANALYTICAL INSTRUMENTATION

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) Explain how sodium is analysed in boiler water of a power plant. [8]

b) Explain the hydrogen purity meter by using thermal conductivity method. [7]

2 a) Explain the principle of paramagnetic oxygen analyser [8]

b) Write about the estimation of sulphur dioxide using conductivitimetry. [7]

3 a) What are the analytical procedures on given samples using Liquid chromatographic methods? [8]

b) Discuss the applications in which gas chromatography is particularly useful. [7]

4 a) Explain the electron capture detector used in the process of gas chromotograhy. [8]

b) Explain in detail photo Ionisation detector used in the process of gas chromatography system with neat sketches. [7]

5 a) Explain about the merits and demerits associated with single and double beam spectrometer? [8]

b) How does IR spectrophotometer analyze various substances? Discuss. [7]

6 a) How is online calorific value measurements made? Explain. [8]

b) Enumerate some of the major applications of UV photometry in brief. [7]

7 a) Explain the constructional details of NMR spectrometer [8]

b) Write about the principle on electron spin resonance. [7]

8 a) Discuss the Industrial application of Gamma Spectrometry. [8]

b) Draw the characteristics of radiation counter tube. [7]