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Total number of printed pages – 2

B. Tech
PEEI 5301 (New)

Sixth Semester (Back) Examination – 2013

ANALYTICAL INSTRUMENTATION

BRANCH : AEIE

QUESTION CODE : B220

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.*

1. Answer the following questions : 2×10
 - (a) Write few advantages of Intelligent Analytical Instrumentation.
 - (b) Write basic principle of operation of a Calorimeter.
 - (c) List sources of error in a Spectrophotometer.
 - (d) Write the name of few Infrared Detectors.
 - (e) What should be the properties of carrier gas in gas chromatography ?
 - (f) Define pH of a solution. Is it required to specify temperature along with pH value of a solution ?
 - (g) What is Paramagnetism ?
 - (h) Justify the name – “Nuclear Magnetic Resonance”.
 - (i) State “Radio-Chemical” effect.
 - (j) Write few properties of X-ray.
2.
 - (a) Describe principle of operation of Ultra-Violet and Visible Spectroscopy. 5
 - (b) Briefly describe different types of Spectrophotometers used in Analytical instrumentation. 5
3.
 - (a) Describe basic components of an Infrared Spectrophotometers. 5
 - (b) Briefly explain principle of operation of Atomic Absorption Spectrophotometers. 5

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4. (a) Describe methods of measurement of peak area in Chromatography. 5
(b) Explain principle of pH measurement and describe electrodes used for pH measurement. 5
5. (a) Briefly explain measurement of Partial Pressure of Oxygen in blood. 5
(b) Describe construction and operation of Infrared Gas Analyzer. 5
6. (a) Describe types and construction of NMR. 5
(b) With a diagram explain the operation of Scintillation Counters. 5
7. (a) Describe construction and principle of operation of Gamma Spectroscopy. 5
(b) Write principle of operation of (i) X-ray Diffractometer, (ii) X-ray Absorption meter. 5
8. Write short notes on any **two** : 5×2
(a) Sample Handling Techniques in Infrared Spectrometer
(b) Basic parts and types of Gas Chromatography
(c) Electron Probe Microanalyzer.

