

**B.E. DEGREE EXAMINATIONS: APRIL 2011**

Sixth Semester

**ELECTRONICS & INSTRUMENTATION ENGINEERING**

U07EI601: Analytical Instruments

**Time: Three hours**

**Maximum Marks: 100**

**Answer ALL Questions:**

**PART A (10 x 1 = 10 Marks)**

1. When a beam of radiant energy strikes a substance
  - a) radiation may be transmitted with little absorption
  - b) direction of beam may be altered by reflection, refraction and diffraction
  - c) radiant energy may be absorbed in part
  - d) all the above
2. Infrared sources are
  - a) Silicon carbide rod.
  - b) barium rod
  - c) Carbon sulfide rod.
  - d) nickel
3. Types of liquid chromatography
  - a) liquid/solid chromatography
  - b) ion-exchange chromatography
  - c) a only
  - d) both a and b
4. The detectors which measure the ability of sample molecules to bend light
  - a) reflective index
  - b) refractive index
  - c) prism
  - d) refract meters
5. Ultraviolet absorption methods cannot be used for the measurement of which gas pollutants
  - a) hydrocarbon
  - b) sulphur oxide
  - c) oxidant
  - d) nitrogen oxides
6. In flame ionization detectors the response is in the proportion of
  - a) carbon numbers
  - b) nitrogen numbers
  - c) oxygen numbers
  - d) sulphur numbers
7. Buffer tablets are available commercially for PH value of
  - a) 4, 7, 9.2
  - b) 5,7,10.3
  - c) 6, 9.5, 7.2
  - d) 2.4, 3, 8.3
8. The potential of measuring electrodes may be written by means of
  - a) Poisson's equation
  - b) nernst equation
  - c) ohms equation
  - d) beckmann's equation
9. The term  $\mu\text{m}$  in lambert beer law stands for
  - a) molar absorptivity
  - b) molar concentration
  - c) mass absorption coefficients
  - d) mass adsorption coefficients
10. The substance which produce minute flashes of light in the visible or near uv range when it absorbs ionizing radiation is
  - a) proportional counter
  - b) scintillator
  - c) gamma counter
  - d) ionization chamber

**PART B (10 x 2 = 20 Marks)**

11. Define BEER LAMBERT'S law
12. Give the application of flame photometry?
13. What is the need of chromatography?
14. What are the advantages of HPLC over gas chromatography?
15. List the various dust monitoring instruments?
16. What are the sources of air pollutants?
17. What are the disadvantages of glass electrode?
18. How the efficiency of sodium analyzer is improved?
19. What are the types of radiation detectors?
20. What is dead time in GM counter?

**PART C (5 x 14 = 70 Marks)**

21. a) Discuss about Atomic Absorption Spectroscopy  
(OR)  
b) What is the principle of colorimetric method? And explain the types of filter Photometers.
  
22. a) Explain in detail about Gas chromatography.  
(OR)  
b) Explain with neat block diagram of high pressure liquid chromatographs.
  
23. a) How to estimate the Air pollution and explain it?.  
(OR)  
b) Explain the principle of Infrared analysis and also explain the single and double beam IR analyser.
  
24. a) (i) With neat sketch, describe about sodium analyser. (8)  
(ii) Discuss about Bio sensor. (6)  
(OR)  
b) Give principle of Ion Selective Electrode. Explain its types with neat Sketch.
  
25. a) Explain the working principle of NMR spectrometer and discuss its application.  
(OR)  
b) Briefly explain (i) GM counter (ii) solid state semiconductor detector.

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