

B.E. DEGREE EXAMINATIONS: APRIL / MAY 2010

Sixth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U07EI601: Analytical Instruments

Time: Three Hours

Maximum Marks: 100

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. What is the measurement range of colorimeter?
A. 200 - 400 μ m B. 400 - 600 μ m C. 400 - 700 μ m D. 300 - 400 μ m
2. Response time of Golay cell is
A. 4 ms B. 8ms C. 14ms D. 16ms
3. What is the pressure rate of carrier gas in Gas Chromatography
A. 10-50 psi B. 10-60psi C. 20-50psi D. 20-60psi
4. Liquid Chromatography is suitable for _____ substance.
A. Unstable B. Stable C. Both A and B D. Solid
5. Concentration of Neon in air by volume is
A. 18.18ppm B. 19.18ppm C. 20.18ppm D.21.18ppm
6. Example of secondary pollutants
A. Co B. So C. No D. Ho
7. What is the pH value of alkaline solution
A. <7 B. >8 C. >7 D. <8
8. What is the other name of anode?
A. Reducing agent B. oxidizing agent
C. Reducing electrode D. Oxidizing electrode
9. Diameter of cathode in GM counter is _____
A. 0.5-1 cm B. 1-2 cm C. 2-3cm D. 3-4cm
10. _____ number of PMT array used in counter
A. 37-89 B. 36-89 C. 37-91 D. 36-91

PART B (10 x 2 = 20 Marks)

11. State Lambert-Beer law.
12. Give the disadvantages of Fourier transform IR spectrometers.

13. Define retention time.
14. What are the advantages of gas chromatography?
15. Why temperature compensation necessary in conductivity measurements?
16. What is the principle of H₂S analyser?
17. Why ammonia gas is added to the sample in Sodium analyser?
18. Give the general classification of PH cell.
19. Mention the limitations of NMR.
20. What is the dead time in GM counter?

PART C (5 x 14 = 70 Marks)

21. (a) With a neat diagram explain the operation double beam UV spectrometer. Mention its advantages.

(OR)

- (b) What are non-dispersive spectrometers? Explain in detail the FTIR spectrometer with its advantages.

22. (a) Explain with neat diagram (i) Thermal conductivity detector (7)
(ii) Flame ionization detector (7)

(OR)

- (b) Explain the working of HPLC with neat sketch.

23. (a) (i) Draw & explain the schematic diagram of a NO-NO₂ analyzer. (7)
(ii) Describe the working principle of a H₂S analyzer. (7)

(OR)

- (b) Explain how oxygen content is measured using its paramagnetic property with neat diagram.

24. (a) (i) Explain the working principle of sodium analyzer with neat diagram. (7)
(ii) With a schematic diagram, explain the working principle of dissolved oxygen analyzer. (7)

(OR)

(b) Explain how pH is measured using glass electrode with suitable diagram.

25. (a) (i) Draw the block diagram of a Fourier Transform NMR Spectrophotometer and explain its working principle. (7)
- (ii) Describe the working of proportional and scintillation counter. (7)

(OR)

- (b) (i) Draw and explain the block diagram showing the major components of Mass spectrometer. (7)
- (ii) Draw and explain the schematic diagram of X-ray tube. (7)
