



**VII Semester BPharm – Make-up End semester Theory Examinations
January 2023**

PQA BP701T: INSTRUMENTAL METHODS OF ANALYSIS (Theory)

Date: 17.01.2023

Duration: - 3 hrs.

Max. Marks: 75

QN Multiple Choice Question MCQs (20Q * 1M = 20M)

- 1 Which of the following is the working principle of Bolometer?
 - a. Peltier effect
 - b. Expansion of inert gas
 - c. Change in charge distribution of pyroelectric material
 - d. Change in resistance with temperature
- 2 Which one of the following transitions is referred as R- band?
 - a. π to π^*
 - b. σ to σ^*
 - c. n to π^*
 - d. n to σ^*
- 3 Which one of the following is the reason for phosphorescence?
 - a. Singlet excited state to ground singlet state
 - b. Triplet excited state to ground singlet state
 - c. Internal conversion
 - d. Collisional deactivation
- 4 Which one of the following is true for Thermistor?
 - a. changes resistance by about 5% degree Celsius
 - b. electrical resistance increases by about 0.4% for every degree Celsius of increase in temp
 - c. thermistor is made of dielectric material
 - d. utilizes the expansion of a gas
- 5 Which one of the following statements is incorrect?
 - a. Electron donating group enhances fluorescence
 - b. saturated cyclic organic compound enhances fluorescence
 - c. High atomic number atom introduced to π - electron system decreases fluorescence
 - d. Increase in temperature decreases fluorescence
- 6 Which one of the following molecules show $\pi \rightarrow \pi^*$ transition?
 - a. Ethane

- b. Ethanol
 - c. Ethene
 - d. Formaldehyde
- 7 Stationary phase in an anion exchange resin has:
- a. Anionic fixed ion and cationic counter ion
 - b. Anionic fixed ion and anionic counter ion
 - c. Cationic fixed ion and anionic counter ion
 - d. Cationic fixed ion cationic counter ion
- 8 Which of the following chromatographic technique is the most preferred for the “Desalting of proteins”?
- a. Ion exchange chromatography
 - b. Partition chromatography
 - c. Size exclusion chromatography
 - d. Adsorption chromatography
- 9 Which of the following statements is not true of “chamber saturation” in planar chromatography?
- a. Ensure a uniform solvent front
 - b. Prevent evaporation of mobile phase from the TLC plate
 - c. Obtain a reproducible and distinct separation of analytes
 - d. Chamber saturation leads to “edge effect”
- 10 Which of the following is correct with respect to Reversed phase chromatography?
- a. Stationary phase is polar
 - b. Stationary phase is non-polar
 - c. Elution starts with a non-polar mobile phase
 - d. Solvent strength of the mobile phase is gradually decreased during elution process
- 11 Mechanism of retention in gas-Liquid chromatography is
- a. Adsorption
 - b. Partition
 - c. Ion-exchange
 - d. Size exclusion
- 12 Principle of flame ionization detector (FID) is based on
- a. The ability of the carrier gas to dissipate heat
 - b. Ionization ability of the flame to ionize carrier gas
 - c. Ionization of carbon containing compounds to CH_3^+ ions
 - d. Ionization of electronegative compounds in the flame
- 13 Which among the following is a universal detector?
- a. Flame ionization detector
 - b. Electron capture detector
 - c. Thermal conductivity detector
 - d. Flame photometric detector

- 14 Which of the following HPLC detector is an example of 'bulk property detector'?
- UV-Visible detector
 - Fluorescence detector
 - Electrochemical detector
 - Refractive index detector
- 15 Which of the following is not true of a chromatogram?
- It is a graph of detector signal against time.
 - Retention time provides qualitative information of a compound.
 - Width of the peak at the base provide information on the velocity of flow rate of the mobile phase.
 - Area under the peak in a chromatogram gives quantitative information of a compound.
- 16 Which of the following is a chromatographic technique?
- GC
 - ELISA
 - Polarography
 - Polarimetry
- 17 Which of the following is not true of polarography?
- Polarography measures the current produced due to electrolysis at the working electrode.
 - DME is used as the working electrode since it is a polarisable electrode.
 - The advantage of DME is that it prevents passivity of the electrode.
 - Nitrogen is purged through the electrolytic solution before a polarographic experiment to remove oxygen from the electrolytic solution
 - Hg is used as the working electrode since it produces amalgams with metals and helps in electrolysis of these metals.
- 18 Which of the following is not true of conductimetry?
- A conductivity cell having electrodes of large surface area is used for the measurement of conductance of a solution of low conductance.
 - Cell constant is calculated using a solution containing 7.41938 g of KCl in 1000g of solution.
 - The concentration of the titrating reagent must be at least 10 times that of the solution being titrated.
 - The end point in a titration between weak acid with a weak base is not sharp and is difficult to get accurately.
 - During the titration of a weak acid with a weak base, the conductance increases gradually till the end point due to the increasing conductance of the salt formed in the titration.
- 19 Principle of quantitative analysis using potentiometry is based on
- Nernst equation
 - Ilkovic equation
 - Beer-lambert equation

d. Kirckoff's law

20 Which of the following electrode is used as working electrode in polarographic experiment?

- a. Glass electrode
- b. Calomel electrode
- c. Silver-Silver chloride electrode
- d. Dropping mercury electrode

II Long Answers 2Q * 10M = 20M

1 Explain the interferences and background correction techniques in atomic absorption spectroscopy.

a. Explain the instrumentation and working of HPLC with a schematic diagram. (5 marks)

2

b. Explain the principle of Flame Ionization Detector in Gas Chromatography. (5 marks)

III Short Answers 7Q * 5M = 35M

3 Explain the applications of fluorescence spectroscopy.

4 Explain the type of transitions involved in UV-Visible spectroscopy with suitable examples.

5 Explain the working of Fourier transform IR spectrophotometer with neat schematic diagram.

6 What are the steps involved in a TLC experiment? Explain the development techniques.

7 Write the Van Deemter equation and explain the terms.

8 Plot a conductometric titration curve and explain its shape.

9 Explain the principle of glass electrode.