Exam Date & Time: 27-Dec-2021 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

VII Semester BPharm - End semester Theory Examinations - Dec 2021

PQA BP701T: INSTRUMENTAL METHODS OF ANALYSIS (Theory)

Instrumental Methods of Analysis [PQA-BP701T]

Marks: 75 **Duration: 180 mins.**

I Multiple Choice Questions (MCQs)

Answer all the questions. Section Duration: 30 mins

1) Which one of the following lamps mostly emits intense ultraviolet light? (1)

1)	Deuterium discharge lamp		2)	Xenon Discharge lamp		3)	Tungsten lamp		4)	Nernst glower	

2) Which one of the following causes hypochromic shift? (1)

1)	Introduction of auxochrome		2)	Distortion of geometry		3)	Removal of conjugation		4)	Change of solvent	

3) Which one of the following is true deviation? (1)

1)	Stray radiation		2)	Change in pH of the solution		3)	Uneven cuvettes		4)	Change in charge distribution of the solution	

4) What is the absorbance value, when intensity of incident light is 100 and transmitted light is 10? (1)

1)	0.30		2)	0.50		3)	1.00		4)	10.00	

5) Which one of the following statements is incorrect? (1)

1)	Intensity of monochromatic light decreases		2)	absorbance is proportional		3)	intensity of a beam of monochromatic light increases		4)	absorption of light is directly	

	exponentially as it passes through a medium of homogeneous thickness			to the thickness (pathlength) of the solution			exponentially as the concentration of the absorbing substances increases arithmetically			proportional to the path length of the sample of substance		

6) Which of the following is the working principle of Bolometer?

1)	Peltier effect		2)	Expansion of inert gas		3)	Change in charge distribution of pyroelectric material		4)	Change in resistance with temperature		(1)

7) Complex mixture in paper chromatography are separated by _____ development technique. (1)

1)	Ascending		2)	Descending		3)	Radial		4)	Two dimensional	

8) _____ reagent is used to detect amino acids in chromatography. (1)

1)	Dragendroff's		2)	Ninhydrin		3)	Bratten Marshall		4)	Phenolphthalein	

9) Tailing and fronting in chromatographic peaks are predominantly due to _____

1)	Variation in distribution constant		2)	Diffusion coefficient of mobile phase		3)	Retention factor		4)	Diameter of packing material		(1)

10) Band Broadening in chromatography may be due to _____

1)	Eddy diffusion		2)	Longitudinal diffusion		3)	Resistance to mass transfer		4)	All the above		(1)

11) Which of the following carrier gas is not used in Gas Chromatography? (1)

1)	Nitrogen		2)	Oxygen		3)	Hydrogen		4)	Helium	

12) Principle of electrochemical detector (ECD) depends on

1)	Ionization ability of β radiation to ionize the Helium gas		2)	Ionization of electronegative compounds		3)	Thermal conductivity of carrier gas		4)	Temperature of the hot wire filament		(1)

13) Principle of PTGC in Gas Chromatography is based on the principle that: (1)

1)	As the temperature of the column increases, analytes comes to the vapour phase easily resulting in reduced retention time.		2)	As per the Clasius clapyron equation, as the temperature increases, the vapour pressure decreases resulting in reduced retention time.		3)	As the temperature increases, the polarity of the column increases.		4)	As the temperature increases, the non polarity increases.	

14) High performance in HPLC is achieved by

1)	Use of reusable column		2)	Use of smaller particle sized stationary phase		3)	Use of longer column		4)	Use of multiple detectors	

(1)

15) Which of the following is an example for a non-polar stationary phase used in HPLC?

1)	Octa decyl silane column		2)	Silica column		3)	Alumina column		4)	Amine column	

(1)

16) Which of the following HPLC detector is an example of 'bulk property detector"?

1)	UV-Visible detector		2)	Fluorescence detector		3)	Electrochemical detector		4)	Refractive index detector	

(1)

17) Which of the following is not true of an electrochemical cell?

1)	Electrode at which the reduction takes place is the cathode.		2)	A cell at closed circuit will not take part in electrochemical reaction.		3)	KCl is used as the salt bridge to reduce the boundary potential.		4)	SHE is always the left hand electrode while measuring the electrode potential.	

(1)

18) Principle of quantitative analysis using potentiometry is based on

1)	Nernst equation		2)	Illkovik equation		3)	Beer-lambert equation		4)	Kirckoff's law	

(1)

19) Potential of SHE is

1)	0.0000		2)	1.000		3)	0.500		4)	10.000	

(1)

20)

(1)

Conducting power of all the ions produced by one mole of the electrolyte in a given solution is called as:

1)	Specific conductance		2)	Equivalent conductance		3)	Molar conductance		4)	Molar conductance at infinite dilution	

II Long Answers

Answer all the questions.

1) a. Explain any two instruments that follow elastic scattering. (5M)
b. Explain the background correction technique used when atoms at electronic energy level split resulting several absorption lines. (5M) (10)

2) With the help of suitable chromatograms, compare the advantages of PTGC operation over isothermal operation. (10)

III Short Answers

Answer all the questions.

1) If intensity of the incident light is Io, intensity transmitted light is I and Absorbance is negative log of Transmittance. Derive Beer-lambert's Law. (5)

2) Explain the effect of following factors on fluorescence intensity with example:
a. Effect of electron donating group & withdrawing group
b. Effect of temperature and viscosity (5)

3) Explain the relevance of Hooke's law in Infrared spectroscopy. (2.5 M)
Explain the fundamental vibrations of a methylene group (--CH2--). (2.5 M) (5)

4) Explain the principle behind column chromatography and enlist the steps involved in developing column chromatography. (5)

5) Explain band broadening by Van Deemter Equation. (5)

6) Discuss the types of currents in polarography. Analyse the significance of these currents in polarography. (5)

7) Construct an indicator electrode for pH meter and discuss the principle of the same. (5)

-----End-----