

17/02/22

Total No. of printed pages = 4

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2021

B.Pharm. 7<sup>th</sup> Semester End-Term Examination

Pharmacy

INSTRUMENTAL METHODS OF ANALYSIS

(New Regulation)

Full Marks – 75

Time – Three hours

The figures in the margin indicate full marks  
for the questions.

1. Answer the following : (MCQ) (20 × 1 = 20)
- (i) A shift to lower wavenumber for an absorption in a spectrum corresponds to
- (a) a shift to higher energy      (b) a shift to lower wavelength  
(c) a shift to lower frequency      (d) a loss of intensity
- (ii) In normal phase HPLC, there is a
- (a) non polar solvent/polar column  
(b) polar solvent/non-polar column  
(c) non polar solvent/non-polar column  
(d) polar solvent/polar column
- (iii) Flame photometry is mainly used for
- (a) 1<sup>st</sup> and 2<sup>nd</sup> group elements      (b) 3<sup>rd</sup> and 4<sup>th</sup> group elements  
(c) whole periodic table      (d) none of these
- (iv) Capillary columns are open tubular columns constructed from which of the following materials?
- (a) Glass      (b) Stainless steel  
(c) Fused silica      (d) None of these

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- (v) Which temperature is required for activation of TLC plate?
- (a) 110 – 120°C (b) 120 – 130°C  
(c) 130 – 149°C (d) 150 – 160°C
- (vi) Which of the following is the function of the chopper in Atomic Absorption Spectroscopy?
- (a) To split the beam into two halves  
(b) To break the steady light into a pulsating light  
(c) To filter unwanted components  
(d) To reduce the sample into atomic state
- (vii) What is the unit of absorbance which can be derived from Beer Lambert's law?
- (a)  $L\ mol^{-1}\ cm^{-1}$  (b)  $L\ gm^{-1}\ cm^{-1}$   
(c)  $cm^{-1}$  (d) No unit
- (viii) When is electrophoresis not used?
- (a) Separation of proteins (b) Separation of amino acids  
(c) Separation of Lipids (d) Separation of nucleic acids
- (ix) Which of the following cannot be used as adsorbent in Column adsorption chromatography?
- (a) Magnesium oxide (b) Silica gel  
(c) Activated alumina (d) Potassium permanganate
- (x) Releasing agents are used in atomic emission spectroscopy to prevent
- (a) Cationic interference (b) Anionic interference  
(c) Both anionic and cationic (d) Physical interference
- (xi) What colour filter is chosen for a green colour solution in colorimetry?
- (a) Purple (b) Orange  
(c) Red (d) Violet
- (xii) Which of the following is not a gel filtration media used in gel chromatography?
- (a) Agarose gel (b) Polyacrylamide gels  
(c) Sephadex (d) Silica gel

- (xiii) Which of the following spectroscopy techniques is associated with molecular emission?
- (a) UV-Visible spectroscopy      (b) IR spectroscopy  
(c) Fluorescence spectroscopy      (d) Flame photometry
- (xiv) Which is not application of ion Exchange Chromatography?
- (a) It is used for softening of water  
(b) It is used for demineralization of water  
(c) It is used for separation of similar ion in one sample  
(d) It is used in preformulation
- (xv) The purpose of Entrance slit is
- (a) to disperse the radiation  
(b) to render light parallel  
(c) to make the radiation fall directly on sample cell  
(d) to get narrow source
- (xvi) Which of the following compounds does not absorb light in the UV/visible spectrum?
- (a) Paracetamol      (b) Aspirin  
(c) Chloral hydrate      (d) Phenobarbitone
- (xvii) Headspace analysis is carried out in order to
- (a) analyse volatile compounds from solid or liquid samples  
(b) determine the psychological state of the instructor  
(c) analyse the column contents ahead of the sample  
(d) determine non-volatiles
- (xviii) A nephelometric analysis is preferred when the sample solution is at
- (a) lower concentration      (b) higher concentration  
(c) any concentration      (d) zero concentration
- (xix) Diffraction grating is made up of
- (a) glass      (b) quartz  
(c) alkali halides      (d) any of these
- (xx) The process of passing a mobile phase through a chromatography column is called which one of the following?
- (a) Flushing      (b) Washing  
(c) Elution      (d) Partitioning

2. Answer any seven questions : (7 × 5 = 35)
- (a) Mention the standard dimensions of TLC plate. How this plate is prepared and activated? (1 + 4 = 5)
  - (b) Describe the instrumentation of IR spectrophotometer briefly.
  - (c) Write short note on: (any one) (1 × 5 = 5)
    - (i) Interferences in flame photometry
    - (ii) Interference filter with its merits and demerits.
  - (d) Of the Ascending/Descending development technique, which one is better and why? Give an example of hydrophobic mobile phase. How will you perform quantitative analysis in paper chromatography? (2 + 1 + 2 = 5)
  - (e) Write a note on detectors used in HPLC instruments.
  - (f) What do you mean by Quenching? Describe various types of Quenching. (1 + 4 = 5)
  - (g) Discuss the types of columns that are used in Gas chromatography.
  - (h) What are the applications of nepheloturbidimetry?
  - (i) Name a specific spraying reagent to detect the following in paper chromatogram :
    - (i) alkaloid
    - (ii) tannin
    - (iii) aldehydes
    - (iv) phenolic compounds
    - (v) cardiac glycoside.

3. Answer any two questions : (2 × 10 = 20)
- (a) How separation takes place in Ion exchange chromatography? Classify ion exchange resins. Describe the factors that affect ion exchange separations. (3 + 4 + 3 = 10)
  - (b) What is the principle involved in column adsorption chromatography? Discuss the characteristics and preparation techniques of column along with different development processes under this chromatography. (2 + 2.5 + 3 + 2.5 = 10)
  - (c) (i) State Beer's Law. Discuss the reasons for deviations from Beer's law. (5)
    - (ii) Draw a double beam UV-Visible spectrophotometer and discuss its advantage-disadvantages. (5)