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2022

B.Pharm. 7th Semester End-Term Examination

Pharmacy

INSTRUMENTAL METHOD 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 MCQs:

(20 × 1 = 20)

(i) Which of the following absorption maxima is not in the visible range of the electronic spectrum?

(a) 550 nm

(b) 250 nm

(c) 480 nm

(d) 750 nm

(ii) Which of the following is used as a reference for the calibration of wavelength of UV-V is spectrophotometer?

(a) Holmium oxide

(b) Potassium dichromate

(c) Toluene in hexane

(d) Potassium Iodide

(iii) Which of the following is the principle of UV-visible spectroscopy?

(a) Electronic transition

(b) molecular vibration

(c) Both (a) and (b)

(d) None of the above

(iv) Molar extinction coefficient has units of _____

(a) $\text{lit.mol}^{-1}.\text{cm}^{-1}$

(b) lit.mol.cm^{-1}

(c) $\text{lit}^{-1}.\text{mol.cm}^{-1}$

(d) $\text{lit}^{-1}.\text{mol}^{-1}.\text{cm}^{-1}$

[Turn over

- (v) _____ is not a source of light in IR spectrometer.
- (a) Globar source (b) Nernst Glower
(c) Deuterium lamp (d) All of the above
- (vi) In acidic medium, aniline show _____ shift.
- (a) Blue (b) Red
(c) Hyperchromic (d) Both (b) and (c)
- (vii) The reference compound used in IR is:
- (a) Water vapour (b) Polystyrene
(c) Both (a) and (b) (d) Aromatic hydrocarbons
- (viii) Cathode of photoemissive cell is made up of:
- (a) Calcium oxide (b) Potassium oxide
(c) Sodium oxide (d) All of the above
- (ix) Which of the following factors increases fluorescence intensity?
- (a) Increase in temperature (b) Electron withdrawing group
(c) Increase in viscosity (d) Electron donating group
- (x) _____ is used to allow only emission radiation to transmit.
- (a) Primary filter (b) Secondary filter
(c) Both (a) and (b) (d) None of the above
- (xi) Flame photometry is used for the determination of compositional analysis of _____
- (a) Solids (b) Alkali metals
(c) Natural gas (d) Isotopes
- (xii) The fraction of free atom that are thermally excited is governed by a _____ distribution.
- (a) Planck's (b) Boltzmann
(c) Einstein (d) Both (a) and (b)
- (xiii) Hypochromic shift is _____
- (a) Increase in wavelength (b) Decrease in wavelength
(c) Increase in intensity (d) Decrease in intensity

- (xiv) Which of the following is not a bending vibration?
- (a) Scissoring (b) Twisting
(c) Wagging (d) Blistering
- (xv) In AAS, which of the following is generally used as a radiation source?
- (a) Mercury arc lamp (b) Hollow cathode lamp
(c) Tungsten Lamp (d) All of the above
- (xvi) The technique electrophoresis, for the separation of charged molecules was developed by:
- (a) Tswett (b) Tisellius
(c) Sanger (d) Svedberg
- (xvii) Peak area in gas chromatogram depends on _____
- (a) Retention time
(b) Concentration of the sample component
(c) HETP
(d) Temperature
- (xviii) Reversed phase chromatography uses a stationary phase, which is _____ in nature.
- (a) Hydrophilic (b) Hydrophobic
(c) Neutral (d) Both (a) and (b)
- (xix) Ion exchange resins are _____
- (a) cross linked polymers (b) Insoluble polymers
(c) porous polymers (d) all of the above
- (xx) Which of the following chromatography is ideal for the study interactions in biochemical process?
- (a) Ion exchange (b) Affinity
(c) Gel permeation (d) HPLC

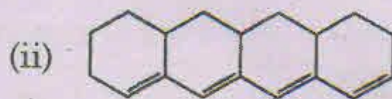
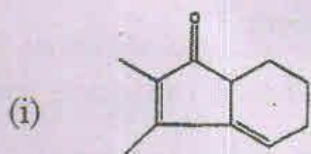
2. Attempt short answers (Answer any seven) :

(7 × 5 = 35)

- (a) Explain the bending vibrations associated with IR spectroscopy. (5)
- (b) Discuss the electronic transitions associated with UV-visible spectroscopy with some examples. (5)

(c) Derive Beer-Lambert's law. (5)

(d) Calculate the λ_{\max} of the following compounds by Woodward-Fieser rule. (2.5+2.5=5)



(e) What are the various detectors used in IR spectroscopy? (5)

(f) What are the different types of quenching? Give examples (5)

(g) Write the instrumentation of HPLC with vivid diagram and explain the working principle. (5)

(h) What are the different types of ion exchange resin? Give examples. (5)

(i) Write a note on working and construction of Photomultiplier tube. (5)

3. Attempt long answers (Answer any two): (2 × 10 = 20)

(a) Explain with detail the instrumentation of single beam UV-spectrophotometer. A 3.15×10^{-6} M solution of colored complex exhibited an absorbance of 0.267 at 635 nm in a 1 cm cuvette. A blank solution had an absorbance of 0.019. Find the molar absorptivity of the colored complex. (6+4=10)

(b) Write the mechanism of ion exchange process in ion exchange chromatography. What are the factors that affect ion exchange process? Give some of its applications in Pharmaceutical research (4+3+3=10)

(c) What is the principle of nepheloturbidimetry? What are its pharmaceutical applications? (5+5=10)

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