

Summer-2023
09/05/23

CJ-02

Instrumental methods of Analysis (BP701T)

Time: Three Hours

Max. Marks: 75

Instruction to Candidates:

1. Do not write anything on question paper except Seat number.
2. All the questions are compulsory.
3. Figures to right indicate full marks.
4. Students should note, no supplement will be provided.
5. Graph or diagram should be drawn with the black ink pen or black HB pencil.

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1. A) Answer all the questions.

- i) Which is not factor for choosing adsorbent?
a) Physical nature b) Solubility c) Chemical nature d) Temperature-
- ii) What is the wavelength range for UV-VIS region?
a) 400-800 nm b) 200-800 nm c) 25-2.5 μ m d) 2.5- 1 mm
- iii) Beer's law states that the intensity of light decreases with respect to -----
a) Concentration b) Distance c) Composition d) Volume
- iv) Which of the following is not true about absorption spectroscopy?
a) It involves transmission
b) Scattering is kept minimum
c) Reflection is kept maximum
d) Intensity of radiation leaving the substance is an indication of concentration
- v) If the absorption of electromagnetic radiation by matter results in the emission of radiation of the same or longer wavelengths for a short time, the phenomenon is termed as which of the following?
a) Luminescence b) Fluorescence c) Phosphorescence d) Spontaneous emission
- vi) Which of the following causes the vibration of atoms?
a) The number of protons contained in a nucleus.
b) Electron movement to higher energy levels.
c) The molecule's total molecular weight.
d) Dipole moments between atoms.
- vii) Nujol means -----
a) Polymer b) Crude oil c) Mineral oil- d) Volatile oil
- viii) Nernst glowler consists of -----
a) Zirconium b) Yttrium c) Chromium d) All of the above
- ix) In atomic absorption spectroscopy, which of the following is the generally used radiation source?
a) Tungsten lamp b) Xenon mercury arc lamp
c) Hydrogen or deuterium discharge lamp d) Hollow cathode lamp
- x) Which of the following is not a component of the emission system in flame photometer?
a) Burner b) Atomizer c) Fuel gases and their regulation d) Chopper

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- xi) The intensity of the scattered light is usually measure at which angle?
a) 90° b) 44° c) 60° d) 70°
- xii) Which technique is used to analyze colloidal system?
a) Nephelometry b) Turbidimetry c) A and B d) Spectroscopy
- xiii) Which is not a property of ion exchangers?
a) They are complex in nature, usually polymeric in nature.
b) They are insoluble in water and organic solvents.
c) They possesses active ions or counter ion that are easily exchange with other ions.
d) They are soluble in water.
- xiv) Which technique separates charged particles using electric field?
a) Hydrolysis b) Electrophoresis c) Protein synthesis d) Protein denaturing
- xv) Which of the following is not a feature of carrier gas used in gas chromatography?
a) It must be chemically inert b) It should be suitable for the detector employed
c) It should not be completely pure. d) It should be cheap
- xvi) Which force is responsible for the separation of the components in descending paper chromatography?
a) Partition b) Adsorption c) Gravity d) Both A and B
- xvii) R_f value is ----
a) Distance travelled by the compound at its point of maximum.
b) Solvent travelled
c) Distance travelled by the standard.
d) None of the above
- xviii) _____ is a liquid column chromatographic method of separating solute molecules according to differences in molecular size.
a) Thin layer chromatography b) Ion exchange chromatography
c) Gel filtration d) Affinity chromatography
- xix) Which of the following is not a step involved in gel filtration?
a) Gel preparation b) Precipitation c) Sample application d) Elution of the sample
- xx) Degassing of the mobile phase can be done by all of the following except
a) Distillation b) Sparging c) Reverse Osmosis d) Vacuum Pumping
2. Attempt any two of the following. 20
i) Explain the instrumentation of UV-VIS spectrophotometer with suitable diagram.
ii) Explain the instrumentation of HPLC with suitable diagram.
iii) Explain the types of electrophoresis in detail.
3. Attempt any seven of the following. 35
i) Which are the factors affecting fluorescence intensity?
ii) Which are the fundamental modes of vibration in molecules?
iii) Explain the types of detectors used in gas chromatography.
iv) What is the principle of affinity chromatography? Add a note on its methodology.
v) Explain the development techniques in paper chromatography.
vi) Explain the instrumentation of nepheloturbidimeter.
vii) Write a note on gel chromatography.
viii) Explain the ion exchange resins for IEC in detail.
ix) Explain the instrumentation for AAS with well labeled diagram.
