SC

[15/A-11] SEAT No._____ No. of printed pages: 02

SARDAR PATEL UNIVERSITY
B. Sc. (Fourth Semester Examination)
Saturday, 13 April, 2019
10.00 a.m. to 12.00 p.m.
US04EICH02 – INSTRUMENTAL METHODS OF ANALYSIS
Total Marks : 70

Q.1 Choose the correct option for the following : [10]

(i) pH is expressed as _____
1. $\log_{10}[H^+]$ 2. $\log [OH^-]$
3. $-\ln [H^+]$ 4. None of these

(ii) Potentiometric titration is used for _____
1. Acid – Base 2. Replacement 3. Precipitation 4. Redox
5. All of the above

(iii) In a potentiometer acid-base titration the graph is plotted _____
1. $\Delta E/\Delta V \rightarrow P$ 2. $\Delta E/\Delta V \rightarrow E$
3. $\Delta E/\Delta V \rightarrow$ weight 4. None of these

(iv) If stationary phase is liquid & moving phase is liquid then the chromatography possible is _____
a. Gel chromatography b. Liquid – solid chromatography
c. Gel permeation chromatography d. None of these

(v) R_M, R_F, R_X are called _____
a. Migration paragraph b. Travelling agent
c. Both 1 & 2 d. None of these

(vi) Write the full name of FID _____
1. Flame infusible detector 2. Foot in detector
3. False intake detector 4. None of these

(vii) High polarity solvent is _____
(a) Acetone (b) n- butane (c) Benzene (d) none of these

(viii) In gas chromatography the mobile phase used is gas but stationary phase may be
(a) Solid & Liquid (b) Liquid & Gas
(c) Solid, Liquid, Gas (d) None

(ix) Which type of bond shifts the UV absorption to shorter wave length
(a) H- bond (b) π- bond (c) σ- bond (d) All of the above

(x) A photomultiplier tube is generally used as a detector in
a) IR Spectroscopy b) UV Spectrophotometers
c) NMR d) ESR

Q.2 Answer the following (Any Ten): [20]

(i) Define: Resistance, Conductance, Equivalent conductance and molar conductance.
(ii) Name different types of conductometric titrations.
(iii) Give advantages and disadvantages of quinhydrone electrode.
(iv) Explain ascending paper chromatography.
(v) Discuss detecting reagents used in Thin Layer chromatography.
(vi) Name the factors affecting column efficiency.

(P.T.O.)

(vii) Write the advantages of gas chromatography.
(viii) Write the applications of HPLC in short.
(ix) Write a short note on: Thermionic detector
(x) Explain the basic principle of UV spectroscopy in brief.
(xi) Give the types of electron in UV spectroscopy.
(xii) Discuss types of transitions in UV spectroscopy.

Q3 Answer the following:

(a) Give the advantages of pH measurements. [3]
(b) Write down advantages of potentiometric titrations. [3]
(c) Write down the advantages and disadvantages of conductometric titrations. [4]

OR

Q3 Answer the following:

(a) Explain effect of dilution on conductance and specific conductance. [3]
(b) Write note on hydrogen electrode. [3]
(c) Write note on potentiometric complexometric titration. [4]

Q4 Answer the following:

(a) Discuss the types of paper chromatography with the diagrams. [3]
(b) Discuss detecting reagents used in Thin Layer chromatography. [3]
(c) Write a note on adsorbent requirement in column chromatography. [4]

OR

Q4 Answer the following:

(a) Name the detectors used in column chromatography and explain one of them with proper diagram. [3]
(b) Explain superiority of TLC over any other method of chromatography. [3]
(c) What is chromatography? Write the highlights of types of chromatography. [4]

Q5 Draw the schematic diagram of GC and explain each part of it. [10]

OR

Q5 Discuss the applications of GC and HPLC techniques and sketch properly labeled block diagram of electron capture detector and HPLC instrument. [10]

Q6 Answer the following:

(a) Write a note on photomultiplier tube. [3]
(b) Derive Lambert – Beer's law and write down deviations from beer's law. [3]
(c) Write the instrumentation of spectrophotometers in short. [4]

OR

Q6 Answer the following:

(a) Write a note on double beam UV spectrophotometer. [3]
(b) Discuss main applications of UV spectroscopy. [3]
(c) Explain types of transitions in inorganic molecules using UV spectroscopy. [4]

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(12)