[8/A-3]

SARDAR PATEL UNIVERSITY

M.Sc. – Chemistry (Second Semester) (NC) (CBCS)

Analytical Chemistry

Course No: PS02ECHE01

Saturday, 29th October, 2016

Time: 10:00 a.m. to 01:00 p.m.

Total Marks: 70

Que.1   Select correct answer of the followings   (08)

1   1000 gm aqueous solution of $CaCO_3$ contains 10 gm of carbonate. Concentration of solution is

   (A) 10 ppm   (B) 100 ppm   (C) 1000 ppm   (D) 10000 ppm

2   For converting a solution if 100 mL KCl of 0.4 M concentration into a solution of KCl 0.05 M concentration. The quantity of water added is

   (A) 700 mL   (B) 900 mL   (C) 500 mL   (D) 300 mL

3   Which of the following is not classified as classical technique?

   (A) Titrimetry method   (B) Optical method

   (C) Precipitation method   (D) Non-Titrimetry method

4   Which of the following is not a part of partial analysis?

   (A) Major analysis   (B) Minor analysis

   (C) Trace analysis   (D) Proximate analysis

5   The particle model in which electromagnetic radiation is viewed as a stream of discrete particles or wave packets of energy is called as_____.

   (A) Photons   (B) Wavenumbers

   (C) Coherent radiation   (D) Radiation

6   Energy of a 5.3 A^0 X- ray photon is

   (A) 2.34×10^{-16} J   (B) 3.75×10^{-16} J

   (C) 1.46×10^{-16} J   (D) 5.3×10^{-16} J

7   In Gas Chromatography, Internal diameter of packed column is

   (A) 1 to 2 mm   (B) 4 to 6 mm   (C) 3 to 5mm   (D) 2 to 4 mm

8   Flame ionization detector is sensitive towards

   (A) Cl_2 (B) CO_2 (C) NO_2 (D) SO_2

Que.2   Attempt any SEVEN of the following   (14)

1   Calculate molality of 90% H_2SO_4 solution is (density = 1.8 gm/ml)

2   Give difference between accuracy and precision.

3   Explain the aspects of validation?

4   Molarity of H_2SO_4 is 18 M. Its density is 1.8 gm/ml. Calculate molality of the given solution.

5   Give the full name of **BLA,ISO,IEC,WSC,AOCS,ASTM**

6   State and explain Lambert - Beer's law.

7   Explain the photoelectric effect.

8   Write four advantages of HPLC.

9   Explain the basic principle of solvent extraction.

Que.3 **A** What do you mean of verification and validation? Explain the categories of **(06)** verification and validation?

B State and describe in detail steps involved in total analysis. **(06)**

OR

B Explain analytical techniques based on principles and purpose of analysis? **(06)**

Que.4 **A** (1) Calculate the concentration of potassium ion in grams per liter after **(03)** mixing 100 mL of 0.250M KCl and 200 mL of 0.100 M K_2SO_4

(2) You wish to prepare a calibration curve for the spectrophotometric **(03)** determination of permanganate. You have a stock 0.100 M solution of $KMnO_4$ and a series of 100 mL volumetric flasks. What volumes of the stock solution will you have to pipette into the flasks to prepare standards of 1.00, 2.00, 5.00 and 10.0 X 10^{-3} M $KMnO_4$ solutions?
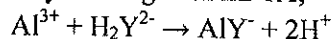
B 1. (a) Calculate the molar concentration of 1.00 ppm solutions each of **(03)** Li^+ and Pb^{2+}.

(b) What weight of $Pb(NO_3)_2$ will have to be dissolved in 1 liter of water to prepare a 100 ppmPb^{2+} solutions?

2. Explain the term statistical analysis and give its applications. **(03)**

OR

B Aluminum is determined by titrating with EDTA; **(06)**
$$Al^{3+} + H_2Y^{2-} \rightarrow AlY^- + 2H^+$$
A 1.00 gm sample requires 20.5 mL EDTA for titration. The EDTA was standardized by titrating 25.0 mL of a 0.100 M $CaCl_2$ solution, requiring 30.0 mL EDTA. Calculate the percent Al_2O_3 in the sample.

Que.5 **A** What do you mean by detector? Explain the photo multiplier detector in **(06)** detail.

B Give the detail about sample container used in optical instrument. **(06)**

OR

B What is electromagnetic radiation? How does electromagnetic radiation **(06)** interact with matter? Show the electromagnetic radiation spectrum.

Que.6 **A** Draw neat and labeled schematic diagram of gas chromatograph and explain **(06)** briefly each and every component. \

B Enumerate various methods of separation along with their principles of **(06)** working.

OR

B 1. Explain the different methods used for paper chromatograpy **(06)**

2. Discuss on various adsorbents used in TLC and detail account on various methods for preparation of thin layer on plates

BEST OF LUCK

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