

77/A17

SEAT No. _____

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SARDAR PATEL UNIVERSITY
2nd Semester, M.Sc. Chemistry Examination (CBCS)

Tuesday, Date: 26/03/2019 (March); Time: 10:00a.m. To 01:00p.m.

Subject: Analytical Chemistry Paper code: PS02ECHE01 Total Marks: 70

N.B.: i) Figures to the right indicate full marks.

ii) Assume the suitable data if necessary and indicate clearly.

Q. 1. Answer highlighting the appropriate option :

[8]

- i. If 25gm of KCl dissolved in 100gm of water the concentration is _____ %w/w
(a) 15 (b) 20
(c) 25 (d) 30
- ii. Modern analytical chemistry is dominated by _____
(a) vehicles (b) Instruments
(c) computers (d) mobiles
- iii. The substance of high purity and stability whose standard solution can be prepared by direct weighing followed by dilution to give solution to definite volume is _____
(a) secondary standard (b) quarterly standard
(c) primary standard (d) None
- iv. Which of the following is **not** a part of partial analysis?
(a) Major analysis (b) Minor analysis
(c) Proximate analysis (d) Trace analysis
- v. Radiation of wavelength 200nm has the frequency _____
(a) 1.5×10^{15} Hz (b) 1.5×10^{13} Hz
(c) 1.2×10^{14} Hz (d) 1.2×10^{10} Hz
- vi. The mobile phase in GC is a _____
(a) gas (b) liquid
(c) solid (d) semi-liquid
- vii. Example of the stationary phase in RPLC(Reverse Phase liquid Chromatography) is
(a) Water (b) Ethylene glycol
(c) Ethylene diamine (d) Dimethylpolysiloxane
- viii. The term 'LASER' is an acronym for _____
(a) Lower Ampere Strong Emission Refraction. (b) Low Amplitude by Systematic Energy of Rotation.
(c) Light Amplifier of Strong Energy Radiation. (d) Light Amplification by Stimulated Emission of Radiation.

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(P.T.O.)

Q. 2. Attempt any Seven :

[14]

- (i). Differentiate classical and instrumental techniques.
- (ii). Give the full name of: BIS, ASTM, I.P., COA.
- (iii). Define the terms: Normality, Molality, Molarity.
- (iv). A 2.6gm sample of plant tissue was analyzed and found to contain 3.6 μ g zinc, so what is concentration of zinc in plant tissue in ppb? and in ppm?
- (v). Calculate the concentration of Na⁺ in ppm if 5mg of NaCl dissolved in 100ml solution.
- (vi). Write the five forms of electromagnetic radiation.
- (vii). Enlist the basic components of optical instruments.
- (viii). Discuss the principle of GC according to Henry's law.
- (ix). Discuss the principle of paper chromatography.

Q. 3. Answer the following :

[A]. Explain analytical techniques based on principles and purpose of analysis? [6]

[B]. Define the cGMP and its component of GMP. [6]

OR

[B]. Define the verification and validation? Describe the categories of validation. [6]

Q. 4. Answer the following :

[A]. Attempt any *two*: [6]

1. Describe basic requirements of Primary Standard.
2. Define and distinguish determinate and indeterminate error.
3. What is the **mean, median** and **range** for following data; 140, 143, 141, 137, 132, 157, 143, 149, 118, 145 mmol/L of Na⁺ ion?

[B]. In an analysis to determine the Iso-propanol content of liquor by gas- chromatography. [6]
The Iso-propanol peak areas for each of a five injection were **2550, 2730, 2835, 2915, 3070**. Calculate (a) the standard deviation of the mean, (b) the relative standard deviation, (c) co-efficient of variation.

OR

[B]. Answer the following : [6]

1. How many milliliters of 50% and 20% solution of KOH should be used to prepare 500mL of 40% solution of KOH?
[Density of KOH: $\delta_{50\%} = 1.525$ gm/cc, $\delta_{20\%} = 1.219$ gm/cc, $\delta_{40\%} = 1.430$ gm/cc].
2. The analysis of Arsenic in the sample replicates are **5.60, 5.64, 5.70, 5.69** and **5.81ppm**. See the last value! Should it be rejected at the 95% confidence level? [$Q_{95} = 0.71$]

Q. 5. Answer the following :

[A]. Attempt any *two* : [6]

1. Explain reasons for deviation from Lambert- Beer's law.
2. What is spectroscopy? Explain in brief the various phenomenon observed after interaction of electromagnetic radiation with matter.
3. Explain wavelengths, frequencies, and energies of electromagnetic radiation.

②

[B]. Explain the basic component of optical instrument and Discuss on sources of radiation. [6]

OR

[B]. Give the detail about sample container used in optical instrument. [6]

Q. 6. Answer the following :

[A]. Enumerate various methods of separation and Classify the chromatographic technique [6]
on the basis of stationary and mobile phases with suitable example.

[B]. Give the basic principle of gas chromatography and discuss in detail on components of [6]
gas chromatography.

OR

[B]. Attempt any two : [6]

1. State the comparison between Column chromatography and Thin Layer chromatography.
2. Gives the Advantages and disadvantages of LC compared to GC.
3. Briefly, discuss about various methods of development in paper chromatography.

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(8)

