[96] SARDAR PATEL UNIVERSITY

M.Sc. (Chemistry)   Semester-2 (NC) Examination

Monday,   Date: 29-10-2018

Time: 10.00 a.m. to 01.00 p.m.

Subject: Analytical Chemistry   Paper: PS02ECHE21

[Total Marks: 70]

N.B.   **(1) Figures to the right indicate full marks.**
(2) Attempt all questions.

1   Select the correct answer from each of the following: **(08)**

1.   Microwave region of electromagnetic radiation generally lies between.
(a) 0.01- 0.10 cm (b) 0.1-10 cm   (c) 10 – 100 cm   (d) 0.1 – 10. 0 cm

2.   In what ratio should be 8N solution of HCl and a 2N solution of the same acid be mixed to prepared a 4N solution?
(a) 1:1   (b) 1:2   (c) 1:3   (d) 1:4

3.   If the substances are too insoluble in the mobile phase solvent, they will appear at _____ of the chromatogram of PC.
(a) at or nearer to solvent front   (c) at or nearer to application point
(b) far from the solvent front   (d) application point

4.   Which of the following is the range of ultra-micro analytical techniques
(a) 0.01- 0.1 gm (b) 1.0 – 10 mg   (c) 10-100 mg   (d) $10^2 – 10^3$ µg

5.   Relative standard deviation = _____ x 100
(a) $S/\bar{x}i$ (b) $S/\sqrt{N}$ (c) $\bar{x}i/S$ (d) S^2

6.   In the reverse phase chromatography, the most polar components eluate
_____.
(a) first   (b) last   (c) slowly   (d) gradually

7.   BIS means
(a) Board of Indian Standards   (c) Bureau of Indian Standards
(b) British Institutional Standards   (d) Bureau of Industrial Standards

8.   The phenomenon of emission of electrons from metal surfaces when exposed to radiation of suitable wavelength is known as:
(a) photoelectrons   (c) phototubes
(b) photoelectric effect   (d) photocell detector

2   Answer the following: (Any Seven)   **(14)**

(i)   Draw neat and labeled block diagram of typical emission spectrometer.

(ii) Define: error and significant figure.

(iii) What do you mean by zero point balance?

(iv) Write Mobile phase based classification of chromatography.

(v)   Give the full name of following acronyms: BLA,USP, NIST and BIS.

[vi] Enlist various types of development in paper chromatography.

[vii] How will the reaction rate change in A + 3B ↔ 2D + E, if the concentrations of substance A and B increase three times?

[viii] Write the five forms of electromagnetic radiations.

[ix] What are the essential elements of quality system (Q.S)?

3 [a] Answer the following: (6

[i] Describe analytical techniques based on principle and phenomenon of analysis.

[ii] Write a note on quality management system (QMS).

OR

[a] Discuss the steps involved in chemical analysis with suitable example. (6|

[b] Discuss in detail on good manufacturing practices and its components.

4 [a] Answer the following: (6|

[i] What is primary and secondary standards? Explain in brief it with suitable examples.

[ii] Determine the molarity and normality for complete and incomplete neutralization of a solution containing 18% H_3PO_4. (density: 1.100 g/cc and Mol. Wt. 98 g/mol)

[b] Answer the following: (6)

[i] The rules for representing SI units.

[ii] Differentiate between Random error and Systematic error.

OR

[b] In gas chromatography, the n-butanol peak areas in arbitrary units of each of five injections were 2550, 2730, 2835, 2915, 3070. Calculate (a) the standard deviation of the mean (b) the relative standard deviation of the mean (c) co-efficient of variation. (6)

5 [a] Write a note in detail on detectors **OR** monochromators used in optical instruments. (6)

[b] Give an account on typical absorption and emission spectrometer. (6)

6 [a] Answer the following: (6)

[i] Describe the significance and factors affecting on Rf value in paper chromatography (PC). (6)

[ii] How can determine of location of spot and Rf value in thin layer chromatography.

[b] Classify the chromatography. Briefly explain the instrumentation of GC. (6)

OR

[b] Enumerate various methods of separation along with their principle of working. (6)