

**[50] SARDAR PATEL UNIVERSITY**

M.Sc. (Chemistry) Examination, Second Semester (CBCS)

Tuesday,

Date: 28-04-2015

Session: Evening

Time: 02.30 p.m. to 05.30 p.m.

Subject: Analytical Chemistry Paper: PS02ECHE01

[Total Marks: 70]

**N.B. (1) Figures to the right indicate full marks.****(2) Attempt all questions.****Q. 1 Select the correct answer from each of the following: (08)**

- In the reverse phase chromatography, the entire surface is converted to \_\_\_\_\_ groups.  
(a) hydrophilic (b) hydrodynamic (c) hydrophobic (d) hygroscopic
- The validation is performed against the written specification or predetermined against expectation, based upon their historical data/evidence that are documented is known as \_\_\_\_\_.  
(a) prospective validation (b) retrospective validation  
(c) periodical validation (d) partial validation
- Electromagnetic radiation is characterized by \_\_\_\_\_.  
(a) Amplitude (b) Periodicity  
(c) Wavelength of frequency (d) All of above
- The result of  $(25 \times 8.923)/100$  expressed to the correct number of significant figure is \_\_\_\_\_.  
(a) 2.23 (b) 2.230 (c) 2.2 (d)  $2.23 \times 10^2$
- Photon of wavelength 765 nm corresponds to \_\_\_\_\_.  
(a)  $13000 \text{ cm}^{-1}$  (b)  $16000 \text{ cm}^{-1}$  (c)  $20000 \text{ cm}^{-1}$  (d)  $24000 \text{ cm}^{-1}$
- The chemical abstracts cover information in the form of  
(a) General method of preparation, properties, use and references  
(b) Comprehensive work with authors name, journal name etc.  
(c) Describe research work done by scientist  
(d) All of above
- A \_\_\_\_\_ is a deviation from the nominal value of standard which is considered to be negligible with respect to its intended use.  
(a) random error (b) standardization (c) tolerance (d) above all
- Relative standard deviation is often called the \_\_\_\_\_.  
(a) co-efficient of variation (b) variance (c) confidence limit (d) None of all

**Q. 2** Answer the following: **(Any Seven)**

**(14)**

- (i) What is principle of gas solid chromatography (GSC)?
- (ii) Define the terms: Verification and Concurrent validation
- (iii) Explain the photoelectric effect.
- (iv) Discuss the principle of paper chromatography.
- (v) Classify the analytical techniques based on purpose of analysis.
- [vi] Enlist the basic components of optical instruments.
- [vii] Define the acronyms: ASTM, cGTP, WSE and BIS
- [viii] Explain: (1) Standard error (2) Determinant error
- [ix] Write the aspects of validation.

**3** [a] What is validation? Explain in brief on their categories.

**(6)**

[b] Explain how to prepare sample and perform the analysis?

**(6)**

**OR**

[b] Answer the following:

**(6)**

- (i) Define and distinguish: Random error and Systematic error.
- (ii) Discuss in brief on quality management system (QMS).

**4** [a] Solve the following:

**(6)**

- [i] How many mL of 50 and 20% solution of NaOH should be used to prepare 500 ml of 40% solution of NaOH. [density of NaOH:  $\delta_{50\%} = 1.525$  g/cc;  $\delta_{20\%} = 1.219$  g/cc;  $\delta_{40\%} = 1.430$  g/cc]
- [ii] If 1 liter of a 4 M solution of substance A and 1 liter of 6 M solution of substance B take part in the reaction  $A + B \leftrightarrow C + D$ . Determine the % yield of product D. (Consider  $K = 9$ ).

[b] Answer the following:

**(6)**

- [i] What do you mean by primary standard and secondary standard substance? Explain it.
- [ii] Explain the term statistical analysis and give its applications.

**OR**

[b] In an analysis to determine the isopropanol content of a liquor by gas chromatography. The isopropanol peak areas for 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] Discuss in brief the following: (8)

[i] Explain in brief on typical absorption and emission spectrometer.

[ii] Explain the importance of wavelength selection in quantitative techniques and methods used for the selection of wavelength.

[b] Write a note on monochromator **OR** sample containers used in optical instruments. (4)

6 [a] Answer the following: (6)

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

[ii] Define the term chromatography. Give the classification of chromatography based on mobile phase and stationary phase.

[b] Give the basic principle of gas chromatography and discuss in detail on the components of gas chromatograph. (6)

**OR**

[b] What is size exclusion chromatography? Explain its principle of working. (6)

