(92) SARDAR PATEL UNIVERSITY

M.Sc. Semester-III: Analytical Chemistry Examination (CBCS)

April-2018, Date: 11.04.2018

Wednesday, Time: 02.00 p.m.to 5.00 p.m.

Paper Code: PS03CANC02

Subject: Elements of analytical chemistry, Total marks: 70

N.B.: i) Figure to the right indicate marks.
ii) Assume the suitable data if necessary and indicate clearly.

Q.1. Answer by highlighting the appropriate option. [08]

i) Random error can be minimized by _____
  a) accurate measurements   b) statistical treatment
  c) minimizing power fluctuation   d) controlling median

ii) Which of the following is responsible for bias?
  a) Random error   b) Determinate error
  c) Both a) and b)   d) Personal error

iii) Automated techniques are more advantageous in terms of ....
  a) Average analysis cost   b) Reproducibility of results
  c) Both a) & b)   d) None.

iv) In automation, which of the following act(s) as separator(s)
  a) GC   b) HPLC
  c) Extraction   d) All

v) What is the function of transistor?
  a) Amplification   b) Switching
  c) Both a) & b)   d) Current regulator

vi) Which of the following is seven segment displays?
  a) LED   b) LCD
  c) CRT   d) α-numeric

vii) Which of the following option is correct for C_m and LOQ?
  a) $C_m = LOQ$ b) $C_m < LOQ$
  c) $C_m > LOQ$ d) $C_m \cong LOQ$

viii) Which of the following is/are test(s) for outlier?
  a) Dixon's test   b) Q-test
  c) Grubbs's test   d) All

Q.2. Attempt any **_Seven_** [14]
  i) State in brief 'automation'.
  ii) Give the significance of mean and median.
  iii) Explain about transducer.
  iv) Discus the block diagram of CHN analyzer.
  v) Discus characteristic features of NDC.
  vi) Explain "performance characteristics of instruments".
  vii) Give a brief-note on transformer.
  viii) Explain the DVM and DMM.
  ix) What do you mean by correlation factor? An analyst reported ammonia concentration in five different samples as 1.40%, 2.53%, 3.45%, 4.41% and 5.58%. If respective taken concentrations are 1.50%, 2.50%, 3.50%, 4.50% and 5.50%, calculate and categorize the correlation factor.

(P.T.O.)

Q.3. **a)** State, and distinguish between, discrete and continuous instruments. [06]

b) Out-line the following [06]
i) Automation of sampling.
ii) Automation strategy and unit operation.

OR

b) What are continuous flow methods? Write a note on flow injection analysis.

Q.4 **a)** Give the detail account of "detection limit". State the significance of LOQ and LOL? [06]

b) Give the classification of analytical techniques. Explain the classification and comparisons of instrumental methods. [06]

OR

b) Discuss the difference between selectivity and sensitivity of Instrument. Give the detail note on selectivity of Instruments.

Q.5. **a)** Discuss the data domain map. Explain analog, time and digital domains. Why digital domain is under the span of electrical and non-electrical domains? [06]

b) Discuss the components of semiconductor and diodes. Explain its application in electronic equipment. [06]

OR

b) Discuss the capacitors and power suppliers. Explain its applications.

Q.6. **a)** What is the confidence limit? Discuss the comparison of results with Q test and student-t-test. [06]

b) Answer the following [06]
i) Using an auto-analyzer, five replicate readings; 65mg, 70mg, 68mg, 60mg, 58mg and 63mg, were obtained on a sample. If auto-analyzer is functional for readings in the 55mg–73mg range, find out % of readings for which it is malfunctioning. [1.960 of standardized value = 2.5 % exceeding value].
ii) Describe in brief various categories of validation.

OR

b) List steps of verifying the method of analysis. Write a note on 'ruggedness testing'.

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