SC

Seat No. _____

No. of Printed Pages:02

(90) SARDAR PATEL UNIVERSITY

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

April-2016, Marks: 70

Wednesday, **Date:** 06.04.2016

Time: 02.30 p.m. to 05.30 p.m., **Paper:** PS03CANC02

Subject: Elements of Analytical Chemistry

N.B.: i) The numbers of the marks carried by each question is indicated at the end of the question
ii) Assume suitable data if considered necessary and indicate the same clearly.

Q.1 Answer by highlighting the right response. [08]

i) Even(s) occur(s) in automatic elemental analyzer is/are
a) Combustion **b)** Separation
c) Both a) and b) **d)** None

ii) The energy source in UV-Visible spectrophotometer is known as_____
a) detector **b)** stimulus
c) Both a) & b) **d)** resonant

iii) The typical laboratory recorder is an example of a _____
a) servo system **b)** battery
c) filter **d)** transistor

iv) What is the function of transistor?
a) amplification **b)** switching
c) current regulator **d)** both (a) and (b)

v) Advantage(s) of the automation of analysis include(s)
a) Fast analysis **b)** Higher precision
c) Reproducible results **d)** All

vi) Which of the following is responsible for bias?
a) random error **b)** determinate error
c) Both a) and b) **d)** Personal error

vii) A relative uncertainty associated with measured 5.33 mg weight is
a) 1.88 % **b)** 18.8 %
c) 0.188 % **d)** 5.6 %

viii) A co-efficient of variation can be expressed using standard deviation 'SD' and Mean as
a) SD*1000/Mean **b)** SD*100/Mean
c) Mean*100/SD **d)** Mean*SD/100

Q.2 **a)** Attempt only **SEVEN** [14]

i) Discuss the function of mean and median.

ii) State the proportional error situation with suitable examples.

iii) Give importance of Dixon's test. A titrimetric method produced 0.11 M, 0.10 M, 0.11 M, 0.13 M, 0.09 M, 0.06 M, 0.12 M, 0.17 M and 0.10 M as replicates of measured ammonia concentration. Comment on outliers using this test [Test critical values at 95 % C.L. are 0.608 (n=8) and 0.564 (n = 9).

iv) Give the brief introduction of microcomputers use in analysis.

v) Draw and discuss the schematic diagram of centrifugal force analyzer.

vi) Give the brief note on transformer.
vii) Explain the sources of systematic errors.
viii) What type of information acquires form 'dynamic range'?
ix) A method of analysis yields the results that are low by 0.3 mg. What minimum size of 1.2% gold sample should be run so that the relative error associated, due to the bias, in determining gold couldn't exceed -0.5%?

Q.3 **a)** What is the difference between selectivity and sensitivity of Instrument? Discuss the selectivity of analyte A, B and C. [06]

b) **Answer the following** [06]

i) What is the source of bias? Explain the bias of analytical method.
ii) Discuss the importance of analytical sensitivity over calibration sensitivity.

OR

b) Describe the classification of analytical techniques and give detail note on instrument for analysis. [06]

Q.4 **a)** Explain the conventional and advance read out devices use in analytical instruments. [06]

b) Explain the off-line, on-line, in-line and intra-line computer conjugation with analytical instruments. [06]

OR

b) Discuss semiconductors and semiconductor devices [06]

Q.5 **a)** Draw and discuss the block diagram of an automated laboratory device. [06]

b) Describe automation of sampling and preliminary sample treatment. [06]

OR

b) Describe in brief automation strategies. Distinguish between the terms 'continuous and discrete devices'. [06]

Q.6 **a)** State the linear-least square method and its significance in chemical analysis. A property 'Yi' is a function of the parameter value 'Xi', as measured below. [06]

Xi	10.2	12.7	08.6	17.5	11.2	11.5
Yi	10.2	11.9	08.6	16.9	10.9	11.1

Calculate the correlation factor(r), and comment on its value.

b) State the 'propagation of error'. A glass bottle weighed 15.62 (±0.12) g empty, and 20.01(±0.10) g with water loaded. If the volume of the water measured was 5.00 (±0.02) mL, then calculate magnitude of error propagated in calculating its density. [06]

OR

b) Describe the ruggedness test, stating its analytical importance. [06]

-F-I-N-I-S-H-