Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name: Analytical Chemistry-II

Subject Code: 4SC06CHC4 **Branch: B.Sc. (Chemistry)**

Semester: 6 **Date: 21/04/2017** **Time: 02:30 To 05:30** **Marks: 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) Give the limitation of electron impact technique. **(1)**
b) How many ^{1}H NMR signals are there in 1-Propanol? **(1)**
c) Define: equivalent protons **(1)**
d) Give the principle of potentiometry method. **(1)**
e) Give the principle of GSC. **(1)**
f) Define: Geminal protons **(1)**
g) Define: pH **(1)**
h) Draw the structure of tetramethyl silane. **(1)**
i) Draw the graph E → Vol. of NaCl for $AgNO_3$→NaCl in Argentometric titration by potentiometry. **(1)**
j) Give the principle of NMR spectroscopy. **(1)**
k) Define: pH **(1)**
l) Define: Metastable ion **(1)**
m) Find out the pH of mixture of 10 ml 0.1 m HCl and 40 ml 0.2 M H_2SO_4. **(1)**
n) Give the full form of FAB technique. **(1)**

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

A. Explain $FeSO_4$→ $Ce(SO_4)_2$ redox titration by potentiometry. **(5)**
B. At 25°C temperature, Fe^{+2} (0.1 M) is titrated against 0.1 M Ce^{+4}. Both solutions are prepared in 1 M H_2SO_4. Calculate the concentration reactant and product at equivalent point. (Formal potential is 0.68 V and 1.44 V) **(5)**
C. Degree of dissociation of CH_3COOH is 1 %. Find out mass of acetic acid in 1 litre solution and pH. **(4)**

Q-3 **Attempt all questions** **(14)**

A. Draw a diagram of mass spectrometer and discuss its various components. **(7)**
B. Discuss α and β cleavage with suitable examples **(7)**

Q-4 **Attempt all questions** **(14)**

A. Draw GLC instrument and discuss its various components in detail. **(7)**
B. Explain factors affecting on GLC and application of GLC. **(7)**

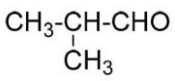
Q-5 **Attempt all questions** **(14)**

A. Why aromatic protons show NMR signal in downfield? **(3)**

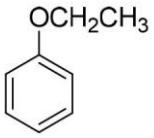
B. In an expleriment the NMR spectrum is recorded with 60 MHz instrument. The peak was obtained at 330 Hz. Calculate δ value and τ value. **(3)**

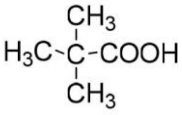
C. Define chemical shift. Why acetylinic protons show NMR signal in upfield? **(4)**

D. Indicate the number of signals and their multiplicity of the following compounds: **(4)**

a) 

c) 

b) 

d) 

Q-6 **Attempt all questions** **(14)**

A. At 25°C temperature, Find out equilibrium constant for the reaction, $Cl_2 + Fe^{2+} \leftrightarrow Cl^- + 2Fe^{+3}$ **(5)**

B. Discuss determination of dissociation constant of weak acid by pH metry. **(5)**

C. Explain titration of Cl^-, Br^-, I^- mixture$\rightarrow AgNO_3$ by Argentometric titration. **(4)**

Q-7 **Attempt all questions** **(14)**

A. Discuss McLafferty rearrangement. **(5)**

B. pH of Floro acetic solution is 2.82 and and $K_a=2.6\times10^{-3}$. Find out concentration of acid. **(5)**

C. Write molecular structure of the following compound and calculate the ^1H NMR signal. **(4)**

i) Cyclobutane
ii) Ethyl bromide
iii) Benzene
iv) 3-bromopentane

Q-8 **Attempt all questions** **(14)**

A. Explain factors influencing chemical shift. **(7)**

B. Explain selection of carrier gas and stationary phase of GLC. **(7)**