CHEMISTRY P-III S.Y.B.Sc SEM-III MARKS 100 TIME 3HRS

NOTE: i) All the questions are compulsory.

ii) Figures to right indicate full marks.

iii) Use of non –programmable calculator / log table is allowed.

Q.1.A. Fill in the blanks with suitable option and rewrite the statement (any **TWELVE**)   (12)

1) Semimicro- analysis refers to sample size of _____ mg.
   (a) 100mg
   (b) 10mg-100mg
   (c) 1mg-10mg

2) Accuracy stands for _____ .
   (a) Precision
   (b) Neutralization
   (c) Reproducibility

3) Acid base titrations are based on _____ reactions.
   a) Precipitation
   b) Neutralization
   c) Complexation

4) _____ is a classical method.
   (a) Polarography
   (b) Nephelometry
   (c) Gravimetry

5) _____ is a separation technique.
   (a) Solvent extraction
   (b) Polarography
   (c) IR spectroscopy

6) In gas liquid chromatography, mobile phase is _____ .
   (a) Solid
   (b) Liquid
   (c) Gas

7) Difference between end point and equivalence point is called as _____ .
   (a) Absolute error
   (b) Relative error
   (c) Titration error

8) Solution in flask is called _____ .
   a) Titrant
   b) Titrand
   c) None of these

9) Succinic acid is used as _____ standard.
   (a) Primary
   (b) Secondary
   (c) tertiary

10) In the titration of weak acid against strong base at equivalence point.
    (a) $pH = 1/2(pKw + pKa + \log C)$
    (b) $pH = 1/2 (pKw - pKa - \log C)$
    (c) $pH = pKw / pKa$

11) In titration of strong acid v/s weak acid, pH at equivalence point is _____ .
    (a) $pH = 1/2(pKw + pKa + \log C)$

(b) pH=1/2 (pKw-pKa-logC)

(c) pH=pKw/pKa

12) In titration of strong acid against weak base, pHat equivalence point is _____.

   (a) Greater than 7

   (b) Less than 7

   (c) Equal to 7

13) Spectrophotometers use _____ as a monochromator.

   (a) Filters

   (b) Gratings

   (c) Both filters and gratings

14) Visible spectrometry use radiation in _____ region of electromagnetic spectrum.

   (a) 400-750nm

   (b) 180-400nm

   (c) 750-950nm

15) The photomultiplier tube is basically _____.

   (a) A photoemissive cell

   (b) A photovoltaic cell

   (c) Neither a photoemessive nor a photovoltaic cell

16) Absorbance of the solution is _____.(where ,T=transmittance,I_0 &I_t are the intensity of incident and radiation respectively)

   (a) –log T

   (b) Log I_t / I_0

   (c) Both a and b

17) According Beer-Lambert's law the plot of absorbance versus concentration is a _____.

   (a) Straight line passing though origin with a positive slope

   (b) Straight line passing through origin with a negative slope

   (c) Straight line with positive slope and intercept on Y axis

18) Introduction of an auxochrome I a molecule shifts the absorption to _____.

   (a) Shorter wavelength

   (b) Longer wavelength

   (c) Higher wavelength

B. state wether following statement is true or false.

 i) Standard deviation expresses precision.

  ii) All precipitates are heated to 250^0C

  iii) Beer-Lambert's equation obeyed if the sample dissociates in solution.

C. Match the following   (5)

I	II
1. Personal error	(a) co-precipitaion
2. Methodic error	(b) decrease in solubility

3. Common ion effect   (c) impurity in precipitate
4. Post precipitation   (d) carelessness
5. Conjugated compounds   (e) shift to longer wavelength

Q.2.answer the following: (any four)   (20)

a. Explain sampling. What is the purpose of sampling?
b. Define: i) gross sampling ii) sampling unit iii) increment iv) sub sample v) analysis sample.
c. calculate the mean and the median for the following sets of values.
  i) 6.10,6.12,6.14,6.10,6.12 and 6.14

  ii) 18.30,18.28,18.32,18.27 and 18.

d. What is sub-sample? Discuss coning and quartering method to reduce the sample size of solid sample.

e. Describe any two types of sampling equipment employed in solid.

f. Discuss the sampling of stationery and flowing liquids.

Q.3.Answer the following: (any four)   (20)

a. Discuss the criteria for selection of an indicator in acid – base titrations.
b. A sample of pure sodium carbonate, Na_2CO_3 weighing 0.3542 g is dissolved in water and titrated with a solution of hydrochloric acid. Avolume of 30.23cm3 is required to reach the methyl orange end point ,the reaction being :
$Na_2CO_3 + 2HCl \longrightarrow 2NaCl + H_2O + CO_2$ Calculate the normality of the acid solution.
c. Explain the conductometric titrations for i) strong acid vs strong base
                                      ii) weak acid vs strong base

d. Explain : how the following factors affect the solubility i)common ion effect
             ii) pH

e. What are acid base indicators? Explain the use of different indicators for different acid base titrations.
f. Explain the properties of colloidal precipitate which tend to stabilze it as a colloid.

Q.4. Answer the following: (any four)   (20)

a. With the help of suitable diagram explain working of single beam colorimeter?
b. Write a note on photovoltaic cell

c. Describe the working of i) prism monochromator ii) diffraction grating monochromator.

d. How are Cu(II) and Bi(III) estimated in a mixture using photometric titration?

e. Explain the calibration curve method of quantitative analysis. How is the concentration of unknown solution calculated without plotting the graph?

f. Discuss the principle and experimental set-up for performing photometric titrations.

Q.5. Answer the following: (any four)   (20)

    a. Write a note on sampling of liquids.
    b. With the help of a suitable diagram explain tools used for sampling of gases.
    c. What are the various types of gravimetric titrations?
    d. Write a note on co-precipitation and post precipitation?
    e. State limitation and advantages of photometric titrations.
    f. Derive mathematical expression of Beer lamberts law.

****