(3 Hours) (Total marks: 75)

N.B.: 1. All questions are compulsory.
2. Figures to right indicate full marks.

Q. I Choose appropriate option for the following multiple choice-based questions. 20

1 Instrument error can be corrected by _____.
   a. Cleaning of instrument and apparatus
   b. Changing instrument and apparatus
   c. Calibration of the instrument and apparatus
   d. Running a blank determination

2 Repeatable results of analytical experiment indicates _____of analytical method
   a. Accuracy
   b. Precision
   c. Error
   d. Reliability

3 What is a measure of precision of analytical measurements?
   a. Standard deviation
   b. Absolute error
   c. Mean absolute error
   d. Mean

4 The strength of 1 M iodine solution is equal to _____ solution
   a. ½ N
   b. 1N
   c. 2N
   d. 1/10 N

5 Ephedrine hydrochloride is assayed bye
   a. Non-aqueous acid-base titrations
   b. Complexometric titration
   c. Precipitation titration
   d. Aqueous acid base titrations

6 Determination of concentration of analyte by polarography is based on _____.
   a. Ilkovic equation
   b. Nernst equation
   c. Ohm's law
   d. Faraday's Law

7 The curve obtained by plotting pH as ordinate against volume of titrant as absiscissa is known as
   a. Neutralisation curve
   b. Precipitation curve
   c. Standard curve
   d. Calibration curve

8 _____is used as indicator in cerimetry
   a. Starch
   b. Ceric ammonium sulphate
   c. Ferroin
   d. Methyl violet

9 The concentration 10 microgram of solute per cm^3 is _____.
   a. 1 ppm
   b. 10 ppb
   c. 10 ppm
   d. 10 %w/v

10 _____ indicator is used for strong acid strong base titrations
   a. Crystal violet
   b. Methyl yellow
   c. Methyl orange
   d. Xylenol orange

11 The titration carried out between the KCl and $AgNO_3$ is termed as _____.
   a. Precipitation titration
   b. Redox titration
   c. Complexometric titration
   d. Non aqueous titration

12 _____is an example of sequestering agent
   a. Dimethyl glyoxime
   b. Potassium chromate
   c. Salicyaldoxime
   d. EDTA

13 _____ is indicator electrode
   a. SHE
   b. Silver chloride electrode
   c. Glass electrode
   d. Calomel electrode

14 The indicator used in complexometric titration are termed as
   a. pM indicator
   b. pH indicator
   c. external indicator
   d. adsorption indicator

15 Benzene is _____ solvent
   a. aprotic solvent
   b. protogenic
   c. photophilic
   d. neutral

16 Identify the correct combination of titrant and indicator:
   a. disodium edetate and mordant balck II
   b. perchloric acid and phenolphthalein
   c. sodium methoxide and starch
   d. sodium thiosulphate and phenol red

17 Solubility of inorganic precipitate is reduced by
   a. addition of acid
   b. addition of organic solvent
   c. increase in temperature
   d. addition of precipitating agent

18 Starch solution is used as an indicator in _____.
   a. Permangnometry
   b. Cerrimetry
   c. Iodine titration
   d. Dichromometry

19 Acidimetry is
    a. Titration of base (analyte) with acid (titrant)
    b. Titration of acid (analyte) with base (titrant)
    c. Determination of purity of acid substance
    d. Blank determination of acidic solvent with base

20 Primary standards are
    a. Solutions of known concentration of analyte
    b. Substances of highest purity
    c. Substances of less purity than secondary standards
    d. Substances of same standards as that of secondary standard

Q. II Answer any two questions. (Any 2)   **20**

1 Explain neutralisation curves. Write a detailed note on theories of acid base indicators.   **10**

2   a. Explain the concept of accuracy and precision of analytical method   **10**
    b. Give two examples of each of the following
        1. Reagent error
        2. Primary standard
        3. Personal error

3 Give an overview on following redox titrations with its principle and applications   **10**
    1. Cerrimetry
    2. Iodimetry
    3. Iodometry

Q. III Answer any seven questions (Any Seven)   **35**

1 Explain the principle and reaction involved in Mohr's method   **5**

2 Give principle and reaction involved in assay of calcium gluconate injection   **5**

3 Explain unit operations in gravimetric analysis   **5**

4 Give principle reaction involved in determination of diazotization titration with suitable example   **5**

5 Explain theory and principle of Conductometry. Give any two applications of conductometry   **5**

6 What is indicator electrode? Give construction and working of glass electrode   **5**

7 Write in detail about DME with respect to construction, working advantages and disadvantages   **5**

8 Replicate water samples are analysed for water hardness with following results 102.2, 102.8, 103.1 and 102.3 ppm $CaCO_3$ calculate Mean, Median and standard Deviation.   **5**

9 When 50 ml of 0.1 M HCl is titrated with 0.1M NaOH, calculate the pH values at the start of the titration and after addition of 10,50,60 ml of titrant.   **5**

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