Anjuman Islam Janjira Degree College of Science Murud-Janjira, Raigad-402401 Affiliated to University of Mumbai	
Class: -S.Y.B.Sc.	**Subject: - Chemistry - III**
Semester: - III	**Course code: -USCH303**
Exam Event: - Summer 2023 (FH)	**Marks: 75**
Date: - 17/10/2023	**Duration: - 2 Hours 30 Mins**

N.B:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Use of log-table/nonprogrammable calculator is allowed.
4. Answer for the same question as far as possible should be written together.

Q.1 Attempt any four of the following. **20**

A. Define Analytical chemistry with its objectives.
B. Explain the terms involved in sampling.
C. Describe about proximate analysis.
D. How will make the correction in analysis from determinate error?
E. In the estimation of chromium in a sample of steel, the results of eight replicate measurements gave the following percentages of chromium. Calculate the standard deviation, variance, relative standard deviation and coefficient of variation. 15.52, 15.56, 15.62, 15.51, 15.53, 15.48, 15.54 and 15.53
F. A chemist prepared a buffer solution of pH 4.62. When an analyst made replicate measurements of pH of the solution by a pH meter, the following values were obtained: 4.59, 4.63 and 4.60. Calculate the absolute error and the relative error for each of these values.

Q.2 Attempt any four of the following. **20**

A. What are the general properties of metal ion indicator?
B. State the differences between volumetry and titrimetry.
C. Describe the condition suitable for titrimetric analysis.
D. Give an account of Standard solution (Primary and Secondary Standard) in titrimetric analysis.
E. Calculate the EWs of Na_2CO_3 the reducing agent, and $K_2Cr_2O_7$, the oxidizing agent, in the following reaction: $3C_2O_4 + Cr_2O_7 + 14H^+ \rightarrow 2Cr^{3+} + 6CO_2 + 7H_2O$
F. Calculate the normality of a solution of nickel nitrate made by dissolving 2.00 g of pure nickel metal in nitric acid and diluting the solution to 500 ml. The nickel is to be titrated with KCN, the following reaction occurring: $Ni^{2+} + 4CN \rightarrow Ni\ (CN)$ .Also calculate the molarity .

Q.3 Attempt any four of the following. **20**

A. Describe detailed about the block diagram of an analytical chemistry instrument.
B. Discuss the concept of plane polarized light in optical methods.
C. Explain some deviation from Beer’s Lambert's law.
D. State the relationship between the analyte, stimulus and measurement of change in observable property.
E. The transmittance of a 2×10^{-4} M solution of a substance was found to be 76.2% at a wave length of 350 nm, when placed in a cell of 1 cm length. Calculate (f) the absorbance (ii) molar absorptivity and (iii) the percent transmittance, if the cell length is 2.0 cm.
F. The absorbance of a 1×10^{-3} M solution placed in a cell with path length 1 cm, was found to be the same as another solution of the same substance placed in a cell with path length 3 cm using the same incident 5×10^{-3} g .dm $^{-3}$ radiation. Calculate the concentration of the second solution.

Q4. A) Select the correct option and complete the following sentences. (any eight) 08

1. The most frequently obtained observation from the given set is known as _____?
   a) mean b) median c) mode
2. Determinate errors are also known as _____
   a) random error b) proportionate error c) systematic error
3. The variance is given by
   a) S/x b) x/S c) S^2
4. ____ of a method is defined as the degree to which the method is free from interferences.
   a) Selectivity b) Sensitivity c) Sparingly soluble
5. Solution in burette is called as_____.
   a) titrant b) titrand c) None of these
6. Solution in flask is called as____.
   a) titrant b) titrand c) None of these
7. Difference between end point and equivalence point is called as____.
   a) absolute error b) relative error c) titration error
8. Succinic acid is used as____standard.
   a) primary b) primary c) tertiary
9. Spectrophotometers use ____ as monochromators.
   a) filter b) grafting c) both filters as well as grafting
10. Visible spectrophotometry use radiation in _____ region of electromagnetic spectrum
    a) 400-750 nm b) 180-400 nm c) 750-950 nm
11. The photomultiplier tube is basically __.
    a) a photo emissive cell b) a photovoltaic cell c) None of these
12. Absorbance of the solution is _____
    a) - log T b) log It/ Io c) both 'a' as well 'b'.

B) State whether the following sentences are True or False. (any three) ` 03

1. Solvent extraction is classical method
2. Electro gravimetry is optical method.
3. In gravimetric analysis drying and ignition is one and the same.
4. Colloidal precipitate is easily filterable.
5. The unit of radiant power is **Js**.

C) Match the following (Any four) 04

i) Phenolphthalein	(a) dispersion compounds
ii) Personal error	(b) shift to longer wavelength
iii) Metallochromic	(c) Eosin
iv) pH Change	(d) Diphenylamine amine indicator
v) Beer Lambert’s Law	(e) carelessness
vi) Conjugated	(f) acid base titration