SAVITRIBAI PHULE PUNE UNIVERSITY

Progressive Education Society's

Modern College of Arts, Science and Commerce, Ganeshkhind, Pune-411016

B.Sc. Blended Program

(A degree of Savitribai Phule Pune University equivalent to the degree of University of Melbourne)

End Semester Examination: October 2024

Program: B.Sc. Blended **Program (Specific):** B.Sc. Blended (Chemistry)

Set: A

Class: T.Y. B.Sc. Blended **Semester: V**

Course code: CHM504 **Course name: Introduction to Analytical Chemistry**

Credits: 3 **Time: 2½ hours** **Maximum marks: 50**

Instructions to the candidate:

- All questions are compulsory.
- Figures to the right indicate marks.
- Draw diagrams wherever necessary.
- Use of scientific calculator is allowed.
- Ask for graph paper if needed.

Q.1] Choose the correct option (Solve <u>ANY 10</u> out of 12) [1 x 10 =10M]

1. _____ is the standard agency for water testing parameters.
   a) NIST b) WHO c) EPA d) APHA

2. In the equation of Beer- Lambert's law A= ЄbC. what does "b" represents _____.
   a) Intensity b) Transmittance c) path length d) absorptivity

3. _____ is characteristic of standard reference electrode.
   a) Long term stability
   b) Ability to return to initial temperature
   c) It should follow Nernst equation
   d) All of these

4. A species that undergoes reduction or oxidation upon application of voltage or current is known as_____.
   a) Electro active Species b) active species c) reactive species d) none of these

5. Colorimeters are used in the_____ region.
   a) 200 nm-600 nm b) 400 nm – 800 nm c) 800 nm- 1200 nm d) 100 nm-400 nm

6. _____ is generally used as an indicator in acid base titration.
   a) Diphenyl amine b) Phenolphthalein c) Potassium ferricyanide d) Methyl orange

7. The number of significant figures in 205062 and 120.53 are ____and _____ respectively.
   a) 6 and 5 b) 4 and 3 c) 4 and 5 d) 5 and 4

8. EDTA is a reagent specific for the estimation of _____ in water.
   a) hardness b) chloride c) Fe d) Cu

9. Vitamin ---------- is Fat soluble Vitamin.

a) A b) B1 c) B2 d) C

10. In differential thermal analysis:
    a) the temperature differences between the sample and reference are measured as a function of temperature
    b) the differences in heat flow into the reference and sample are measured as a function of temperature
    c) the change in the mass of the sample is measured as a function of temperature
    d) the glass transition is observed as a sharp peak

11. _____ is not a water soluble vitamin.

    a) Vitamin A b) Vitamin B1 c) Vitamin C d) Vitamin B12

12. Which of the following methods can be used for the measurement of the change in weight of the oxysalts?
    a) Thermoelectric analysis b) Wagner analysis
    c) Stockbarger analysis d) Thermal analysis

Q.2] Answer the following in short (<u>ANY 10</u> out of 12) [2 x 10 = 20M]

1. What are different applications of electroanalytical analysis?
2. Define the term BOD and COD.
3. What are the physical parameters for water analysis?
4. Consider the following set of data for certain measurements and Find the absolute error and relative error in the measurements.

Set A		**Set B**	
True Value	Observed Value	True Value	Observed Value
712.6	705.0	1.54	1.42

5. What are water soluble vitamins?
6. Draw neat, labelled diagram of Differential scanning Calorimeter.
7. Enlist the different types of recording balances used in TGA.
8. Give the classification of vitamins.
9. What is Hyphenated technique? Enlist various hyphenated techniques.
10. Explain the different types of volumetric titrations.
11. What are different applications of thermal analysis?
12. What are the applications of neutron activation analysis (NAA)?

Q.3. Answer in brief (<u>ANY 4</u> out of 6) **[4 x 5 = 20M]**

1. Discuss the instrumentation for thermogravimetric analysis.
2. Write a note on fat soluble vitamins with respect to their occurrence and their sources.
3. Enlist the basic wastewater treatments methods.
4. Four different samples of silver alloy were analysed for silver and were found to contain 15.35, 15.39, 15.12 and 15.02 percent of silver. Calculate the mean deviation, standard deviation and relative mean deviation in the results.
5. 0.3 gm of Mn was irradiated with nuclear flux 4 X 10^6 n $cm^{-2}s^{-1}$ for 5 hrs. Find activity of the sample at the end of irradiation. Given: Capture cross section = 12 barn, Isotopic abundance = 100%, $t_{1/2}$ of Mn^{56} = 2.5 hrs.
6. Write the cell reaction and calculate the Ecell of the following cell at 30°C. $Cd/CdCl_2$ (0.5M)//AgCl(0.3M)/Ag. (Standard electrode potential E^ocell is 0.231 volts).

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