



B-003-1101004

Seat No. _____

M. Sc. (Sem. I) (CBCS) Examination

March - 2021

C - 104 : Chemistry

(Analytical Chemistry) (New Course)

Faculty Code : 003

Subject Code : 1101004

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) All questions carry equal marks.
(2) Attempt any five questions out of ten.

1 Answer the following :

- (a) Define acetyl and hydroxyl value of an oil and fat and give their reaction.
- (b) Give the reasons for performing non-aqueous acid base titration.
- (c) How will you determine vitamin B₁ in food sample by fluorimetry ?
- (d) Explain Bronsted-Lowry theory of acid-base with example, advantages and limitations.
- (e) Give the principle of atomic absorption spectroscopy.
- (f) List at least four names of indicators used in complexometric, precipitation and redox titration.
- (g) How will you detect adulteration of rice-bran oil ?

2 Answer the following :

- (a) Explain Lewis theory of acid-base with example, advantages and limitations.
- (b) Give the applications of phosphorimetry.
- (c) Calculate the normality of solution containing following :
(1) 5.30 g/lit Na_2CO_3 (2) 5.267 g/lit $\text{K}_2\text{Cr}_2\text{O}_7$
- (d) Give the advantages of atomic absorption spectroscopy over flame emission spectroscopy.
- (e) How will you determine argemone oil by ferric chloride test ?
- (f) Give the chemical constituents of oil and fat. Classify them with examples.
- (g) Iodine is an oxidizing agent that is reaction with reducing agent is reduced to iodide ion (I). How many gms I_2 would you weight out to prepare 100 ml of 0.10 N I_2 solution.

3 Answer the following :

- (a) Draw the schematic diagram of atomic absorption spectrometer. Give the name of each components of AAS and discuss in detail the source of radiation used in it.
- (b) Define Luminescence, fluorescence and phosphorence. Discuss in detail the singlet and triplet state theory.

4 Answer the following :

- (a) Define saponification value. Give principle and analytical importance of it. How will you determine saponification value of oil ?
- (b) Classify the solvents used in non-aqueous acid-base titrations. Explain leveling effect of protophilic solvent on weak acid analyte and weak base analyte.

5 Answer the following :

- (a) Discuss the instrumentation working of fluorimetry with diagram in detail.
- (b) What is iodine value ? Give the principle and analytical importance of it. How will you determine iodine value of an oil or fat ?

6 Answer the following :

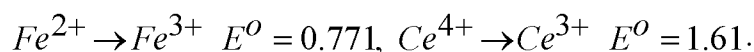
- (a) Explain the theory of titration of weak acid against strong base titrant in non-aqueous solvent and apparatus used for it.
- (b) How will you determine lead in petrol by atomic absorption spectroscopy.

7 Answer the following :

- (a) Draw the block diagram of phosphorimetry and discuss the functioning of it.
- (b) What are protogenic solvents ? Explain leveling effect of protogenic solvent on weak base analyte. Discuss the theory of titration off weak base in non aqueous solvent.

8 Answer the following :

- (a) Calculate the potential as a function of titrant volume in the titration of 100 ml of 0.10 M Fe^{2+} at 10.0, 50.0, 100.0 and 200 ml of 0.10 M Ce^{4+} .



- (b) Calculate p^{CL} for the titration of 100.0 ml of 0.10 M NaCl with 0.10 M $AgNO_3$ for the addition of 0.0, 20.0, 99.0, 99.5 and 100.5 ml of $AgNO_3$ $K_{sp} AgCl = 1.0 \times 10^{-10}$.

9 Answer the following :

- (a) Discuss the interferences in atomic absorption spectroscopy measurement.
- (b) Write note on RMPK value in detail.

10 Answer the following :

- (a) Explain rancidity of an oil. Discuss the tests for rancidity measurement in detail.
 - (b) What are neutralization titrations ? Give examples of various neutralization titrations. Derive hypothetical titration curve for the titration of 20.0 ml 0.1 M HCl and 0.1 M NaOH at 0, 5, 10, 20, 25 and 30 ml of titrant added.
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