CHEM/IV/EC/07

Student's Copy

2024

(CBCS)

(4th Semester)

CHEMISTRY

FOURTH PAPER

(Analytical Chemistry-I)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(SECTION : A-OBJECTIVE)

(Marks: 10)

Tick (✓) the correct answer in the brackets provided :

 $1 \times 10 = 10$

1. Which one of the following is an interfering ion?

- (a) NO_{3}^{-} ()
- (b) $C_2 O_4^{2-}$ ()
- (c) CO_3^{2-} ()
- (d) SO_4^{2-} ()

/522

- Ņ depends The solubility product is g a kind of equilibrium constant and its value
- a) volume
- 6 energy
- <u>(</u>) temperature
- (d) heat
- ω The completely immiscible solution mixture can be separated by
- æ separating funnel
- 9 sublimation
- 0 condensation
- (d) evaporation
- 4 Why is zone refining carried out in an inert atmosphere?
- a To prevent reduction of metal
- Θ To reduce the external pressure
- 0
- (d To reduce the external temperature
- 70

- prevent oxidation of metal

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N

- Ġ The significant figures is sum of the numbers 436.32, 227.2 and 0.301 in appropriate
- (a) 663·821 ()
- (b) 664 (
- (c) 663·82 (
- (d) 663·8 ()
- ġ The property of a measuring instrument to give the output very close to the actual value is termed as
- (a) sensitivity ()
- (b) precision (
- (c) repeatability (
- (d) accuracy (
- 7 Which of the following is not an acid-base indicator?
- (a) Methyl orange (
- (b) Phenolphthalein ()
- (c) Methylene blue (
- (d) Methyl red ()

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/522 5 [C	OR 10. Write a brief note on purification of precipitates.	UNIT—V 9. Discuss the application of 1-nitroso-2-naphthol in inorganic analysis.	OR 8. Explain 'redox titration' with one example.	UNITIV 7. Explain 'acid-base titration' with an example.	OR 6. What is meant by the term 'confidence limit? What is its significance?	UNIT—III 5. Write a short note on reporting of analytical data.	OR 4. Explain liquid-liquid extraction.	UNIT	UNITI 1. Write the advantage of hot plate over Bunsen burner for heating. OR 2. Write the importance of personal protective equipment (PPE) in the laboratory.	Answer the following : 3×	(SECTION: B—SHORT ANSWERS) (Marks: 15)
[Contd.		alysis.			ficance?				ng. C) in the	3×5=15	

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SECTION : C-DESCRIPTIVE)

(Marks : 50)

Answer the following :

UNIT-I

10×5=50

- ۲ â Write a brief note on safe handling and storage of ethers.
- (b) Write a brief note on MSDS.
- (c) Define the following terms :

1×4=4

ωω

- (i) Acute toxicity
- (ii) Lower flammability limit
- (iii) Auto-ignition temperature
- (iv) Physical antidote

OR

- Ņ â Explain during storage. the importance of segregation of incompatible chemicals
- 9 in the separation of analytical groups I and II in inorganic salt analysis. Discuss the use of common-ion effect and solubility product principle
- 6 qualitative analysis Describe the process of removal of any one interfering anion in

UNIT-II

ω a) Discuss the method of zone refining for the purification of material.

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- Ð Describe the uses of crown ethers in the process of extraction.
- 0 Explain in detail the principle of steam distillation.

OR

- 4 a) Describe the Craig method of multiple extraction.
- (b) What does enrichment factor mean?
- (c) Write the theory of fractional distillation

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ģ a Distinguish between accuracy and precision.

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- Ð What are errors detected the different types of determinate error? How are and corrected? these 2+2=4
- <u>(</u>) What is meant by the term 'confidence limit'? How is it determined? ω

ß

- ō a) What mathematical expression and explain the terms involved. are the different ways of expressing precision? Write the ω
- Ð Compute the result of the following expressions : 2+2=4
- (i) $(23 \cdot 4 \pm 0 \cdot 1)(17 \cdot 7 \pm 0 \cdot 05)$
- (ii) $(16 \cdot 6 \pm 0 \cdot 1) - 2(16 \cdot 7 \pm 0 \cdot 2) + 3(7 \cdot 3 \pm 0 \cdot 01)$
- <u></u> anomalous result. Describe Q-test which is applied for rejection or retention of an ω

UNIT-IV

- 7 æ Differentiate between end point and equivalence point. ω
- Ð Explain the following terms : $1 \times 3 = 3$
- (i) Titration
- (ii) Analyte
- (iii) Standard solution
- <u></u> of oxalic Calculate the molarity and normality of a solution containing 1000 ml of the solution acid crystal $(H_2C_2O_4 \cdot 2H_2O, mol. wt. = 126)$ dissolved 6 5 ĝ

4

QR

- 00 a What are primary and secondary standards? Give example of each ω
- Ξ What are iodometric and iodimetric titrations? Discuss with example 4
- 6 Write example a note on the theory of acid-base indicators giving suitable ω

Contd.

UNIT-V

<u>و</u> <u>a</u> Differentiate between coprecipitation and post-precipitation.

ω

- Ξ Describe the separation of calcium and relevant equations. barium in a mixture with ω
- <u>(</u> Write the structures and uses of the following reagents in inorganic analysis : 2+2=4
- (i) Rhodamine-B
- (ii) Dithiazone

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- **1**0 <u>(</u>2 analysis. Draw the structure of oxine and explain its application in inorganic ω
- (b) Write the theory of precipitates.
- <u>೧</u> How would you separate iron and copper ions present in a mixture?

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- eduivalence point is 8. The pH of titration mixture for strong acid-strong base titration at
- () t (D)
- () L (9)
- () ム・て (つ)
- () Z·6 (p)
- precipitate solution containing soluble impurities. 9. Name the process that contaminates the precipitates and also carries the
- () (a) Coprecipitation
- () Supersaturation ()
- () (c) Reprecipitation
- () noitulos (b)
- 10. The analytical reagent used to separate and precipitate metals such as
-) (airezile (a)
- () uorrsiquo (d)
- () əuixo (ə)
- ((q) qimethylglyoxime

(SECTION : B-SHORT ANSWERS)

and the second

(Marks: 15)

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I-TINU

1. Write the advantage of hot plate over Bunsen burner for heating.

ОВ

 Write the importance of personal protective equipment (PPE) in the laboratory.

II—TINU

3. Explain solvent extraction.

ОВ

4. Explain liquid-liquid extraction.

III—TINU

5. Write a short note on reporting of analytical data.

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6. What is meant by the term 'confidence limit'? What is its significance?

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7. Explain 'acid-base titration' with an example.

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[Contd.

3×2=12

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