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G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.



UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.

(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.Sc., CHEMISTRY

| SEM | CATEGORY | COMPONENT | COURSE CODE | COURSE TITLE |
|-----|------------|-----------------|-------------|-------------------------------|
| V | PART - III | CORE ELEEECTIVE | U21CH5E1A | ADVANCED ANALYTICAL CHEMISTRY |

Date & Session: 03.05.2025/AN

Time: 3 hours

Maximum: 75 Marks

| Course Outcome | Bloom's K-level | Q. No. | SECTION – A (10 X 1 = 10 Marks) Answer <u>ALL</u> Questions. |
|----------------|-----------------|--------|--|
| CO1 | K1 | 1. | The nearness of a measured value to its expected value is called as -----. a) precision b) accuracy c) error d) significance |
| CO1 | K2 | 2. | The significant figure in the numerical figure 0.0049 is -----. a) 2 b) 3 c) 4 d) 5 |
| CO2 | K1 | 3. | Hardness of water is due the presence of salts of -----. a) K b) Cl_2 c) Mg d) B |
| CO2 | K2 | 4. | ___ is the amount of oxygen required to oxidize only organic matter in sewage. a) ORD b) COD c) CD d) BOD |
| CO3 | K1 | 5. | Which gaseous fuel is obtained by partial combustion of coke? a) coal gas b) Producer gas c) Coke oven gas d) Blast furnace gas |
| CO3 | K2 | 6. | Example for gaseous fuel is/are _____. a) LPG b) Producer gas c) water gas d) all of these |
| CO4 | K1 | 7. | The working electrode in polarography is usually _____. a) Glass b) Dropping mercury electrode c) Platinum d) Silver |
| CO4 | K2 | 8. | Amperometry measures _____. a) Voltage b) Current c) Temperature d) Mass |
| CO5 | K1 | 9. | DTA plot is drawn between _____. a) temperature Vs time b) ΔT Vs temperature c) ΔT Vs pressure d) ΔT Vs weight |
| CO5 | K2 | 10. | The two main techniques for thermal analysis are-----. a) FTG AND DGG b) MSP AND FCT c) TGA AND DTA d) TSA AND DGF |
| Course Outcome | Bloom's K-level | Q. No. | SECTION – B (5 X 5 = 25 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b) |
| CO1 | K3 | 11a. | Illustrate any two fuel analysis techniques with explanation (2.5M Each). (OR) |
| CO1 | K3 | 11b. | Explain the chemical characterization of water. |
| CO2 | K3 | 12a. | Sketch the instrumentation of nepheloturbidometry and explain in detail. (OR) |
| CO2 | K3 | 12b. | Apply the detection and elimination of systematic errors for quantitative analysis. |

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| CO3 | K4 | 13a. | Compare T- test with Q-test. (OR) |
| CO3 | K4 | 13b. | Categorize the errors. |
| CO4 | K4 | 14a. | Examine the factors affecting TGA and DTA curves. (OR) |
| CO4 | K4 | 14b. | Distinguish between chemical oxygen demand and biochemical oxygen demand. |
| CO5 | K5 | 15a. | The number of significant figures of the following: i) 7.00593 ii) 300.0 iii) 203.0×10^{-2} iv) 745Km v) 0.000005 (OR) |
| CO5 | K5 | 15b. | In a set of measurements, the following concentrations of Fe (ppm) were reported: 20.2, 20.4, 20.3, 20.1, 19.9, 20.0 and 19.8. Evaluate: i) Standard deviation ii) Relative standard deviation and iii) Coefficient of variation. |

| Course Outcome | Bloom's K-level | Q. No. | SECTION – C (5 X 8 = 40 Marks) Answer ALL Questions choosing either (a) or (b) |
|----------------|-----------------|--------|--|
| CO1 | K3 | 16a. | Write about qualitative applications of polarography to inorganic systems. (OR) |
| CO1 | K3 | 16b. | Write about the principle of coulometric titration. |
| CO2 | K4 | 17a. | Bring out the differences between electro-gravimetric method and coulometric method. (OR) |
| CO2 | K4 | 17b. | Compare and contrast TGA and DSC in terms of principles, instrumentation and applications. |
| CO3 | K4 | 18a. | How will you determine the metal ions through the electrogravimetric analysis? (OR) |
| CO3 | K4 | 18b. | Differentiate accuracy and precision with examples. |
| CO4 | K5 | 19a. | Using the data set: 3, 4, 5, 5, 6, 7, 5, 8, 9, and 2. Find the following, Mean, Median, Mode, variance. (OR) |
| CO4 | K5 | 19b. | Interpret the DTA curve of calcium oxalate monohydrate and the processes involved in it. |
| CO5 | K5 | 20a. | Evaluate the thermometric titration plots of exothermic and endothermic reactions. (OR) |
| CO5 | K5 | 20b. | Analysis of a sample iron ore gave the following percentage values for the iron; 7.08, 7.21, 7.12, 7.09, 7.16, 7.14, 7.18, 7.11. Calculate the mean, standard deviation and coefficient of variation for values. |