**ANNEXURE**

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**

**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**

**N-SCHEME**

(Implements from the Academic year 2019-2020 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and film & TV.

Subject Code : **40017**

Semester : I Semester

Subject Title : **ENGINEERING CHEMISTRY** – **I PRACTICAL**

**TEACHING AND SCHEME OF EXAMINATION**

Number of weeks per semester: 15 weeks

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Subject | Instructions | | Examination | | | |
| ENGINEERING CHEMISTRY- I PRACTICAL | Hours / Week | Hours / Semester | Marks | | | Duration |
| 2 Hrs. | 30 Hrs. | Internal Assessment | Board Examination | Total |
| 25 | 100 | 100 | 3 Hrs. |

**OBJECTIVES:**

1. At the end of the program the student will have knowledge about volumetric analysis in acidimetric, alkalimetric and permanganometric titration and their applications.
2. To get knowledge of estimation of total hardness, temporary and permanent hardness in the hard water sample.
3. To get knowledge about measurement of TDS, pH and to calculate Hydrogen ion concentration in a solution.
4. To get knowledge of estimation of dissolved chlorine in a water sample.

**Intellectual Skills**

1. Carrying out Volumetric titrations and calculation of masses

2. Knowing units for Concentrations of solutions

**Motor Skills**

1. Measure quantities accurately

2. Observe chemical reactions

3. Handle the apparatus carefully

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**CONTENTS**

**Note:**

1. The students should be provided with individual facility to complete the experiment.
2. Proper safety arrangement should be made for the laboratory.
3. Proper instruction and care should be given while handling chemicals and acids.

**Acidimetry and Alkalimetry**

1. Estimate the amount of sulphuric acid present in ………. ml of a given solution using Standard solution of HCl of strength……………..N and an approximately decinormal solution of NaOH.
2. Estimate the amount of NaOH present in ……….ml the given solution using a standard solution of KOH of strength ………….N   and approximately decinormal solution of H2SO4

**ii) Permanganometry**

1. Estimation of the amount of Mohr salt present in……….ml of the given solution using a standard solution of ferrous sulphate of strength …………N and an an approximately decinormal solution of KMnO4.
2. Estimation of the amount of of Fe 2+ present in……….ml of the given solution using a standard solution of ferrous ammonium sulphate of strength …………N and an an approximately decinormal solution of KMnO4.
3. Compare of strength of two given KMnO4 solution and estimate the stronger/weaker solution present in ………….ml using a standard solution of ferrous ammonium sulphate of strength …………N

**iii) Water Analysis**

1. Water analysis for dissolved chlorine
2. Estimation of total hardness of a sample using EDTA
3. Water quality testing, pH, TDS (3 sample)

Determination of pH using a pH meter and calculation of hydrogen ion Concentrations in the solutions and TDS using TDS meter (For three given samples).

**(This question may be given to any two students per batch).**

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**BOARD EXAMINATION**

**Note:**

1. Individual apparatus / equipment should be provided for the batch strength. The same experiment should be given with different skilled value in a batch.
2. The eighth experiment (Determination of pH) may be given to any two students per batch.
3. All the experiments must be given in all the batches.
4. Any one experiment should be given by lot for the Board Practical Examination.
5. The external examiner should verify the availability of the apparatus / equipment for the batch strength before the commencement of Practical Examination.
6. Properly evaluated record note book should be submitted for the Board Practical Examination.

##### **DETAILED ALLOCATION OF MARKS**

###### **Board Practical Examination: 100 Marks**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Volumetric Analysis** | |  | **Determination of pH** | |
| **Content** | **Mark Allotted** | **Content** | **Mark Allotted** |
| Short Procedure | 07 | ANSWER FOR SHORT QUESTIONS ON pH & TDS | 07 |
| Titration – I | 33 | DETERMINATION OF pH | 27 |
| Titration – II | 33 | CALCULATION OF [H+] | 33 |
| Calculations (3x7) | 21 | Determination of TDS | 27 |
| Viva – Voce | 06 | VIVA –VOCE | 06 |
| **Total Marks** | **100** | **Total Marks** | **100** |

**Guide lines for Evaluation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Titration value accuracy for Titration – I and II** | |  | **pH value Accuracy:** | |
| **ACCURACY** | **MARKS** | **ACCURACY** | **MARKS** |
| ± 0.2 ml | 33 | ± 0.2 | 9 |
| above ± 0.2 ml to ± 0.4 ml | 28 | above ± 0.2 to ± 0.4 | 7 |
| above ± 0.4 ml to ± 0.6 ml | 23 | above ± 0.4 | 5 |
| above ± 0.6 ml | 7 |  |  |

###### **Internal Assessment: 25 Marks**

|  |  |
| --- | --- |
| **Content** | **Mark Allotted** |
| Observation | 10 |
| Record | 10 |
| Attendance | 5 |
| **Total Marks** | **25** |

**MODEL QUESTION PAPER**

**MODEL 1: 3 Hours**

Estimate the mass of Iron present in whole of the given ferrous sulphate solution using a standard solution of ferrous ammonium sulphate of strength 0.1N and an approximately decinormal solution of potassium permanganate.

**MODEL 2: 3 Hours**

Calculate the total hardness of the given sample of water using a standard hard water solution of molarity 0.01M and an approximately decimolar solution of EDTA.

**MODEL 3: 3 Hours**

Determine the pH of three given samples using pH meter and calculate the hydrogen ion concentration of the samples determine the TDS of the same sample. (Any two students per batch).

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**APPARATUS / EQUIPMENT REQUIRED -** Batch Strength: 30 students

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl.No.** | **Name of the Item** | **Quantity (Nos.)** | **Total Quantity** |
| 1 | Beaker (100 ml) | 1 |  |
| 2 | Burette (50 ml) | 1 |  |
| 3 | Burette Stand | 1 |  |
| 4 | Conical Flask (250 ml) | 1 |  |
| 5 | Funnel | 1 |  |
| 6 | Pipette (20 ml) | 1 |  |
| 7 | Porcelain Tile | 1 |  |
| 8 | Standard Flask (100 ml) | 1 |  |
| 9 | Wash Bottle | 1 |  |
| 10 | pH meter | 1 |  |
| 11 | TDS meter | 1 |  |
| 12 | Solutions |  |