ANNEXURE

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU
DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS
M-SCHEME
(Implements from the Academic year 2015-2016 onwards

Course Name: All Branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and Film & TV

Subject Code: **30017**

Semester : I Semester

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

TEACHING AND SCHEME OF INSTRUCTIONS AND EXAMINATION:

No. of Weeks per Semester: 15 Weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours/ Week	Hours/ Semester	Internal Assessment/ Record	Board Examination	Total	
ENGINEERING CHEMISTRY – I PRACTICAL	2	30	25	75	100	3 Hours

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 pH and to calculate Hydrogen ion concentration in a solution.

30017 ENGINEERING CHEMISTRY – I PRACTICAL

CONTENTS

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

Acidimetry and Alkalimetry

1. Estimation of weak base (sodium carbonate) using a standard solution of sodium hydroxide and sulphuric acid as link solution. [Test solution should be made up to 100 ml]
2. Estimation of strong base (sodium hydroxide) using a standard solution of sodium carbonate and sulphuric acid as link solution. [Test solution should be made up to 100 ml]
3. Comparison of strengths of two acid solutions using a standard solution of sodium hydroxide
4. Comparison of strengths of two alkaline solutions using a standard solution of oxalic acid

Permanganometry

5. Estimation of Mohr's salt using a standard solution of ferrous sulphate and potassium permanganate as link solution. [Test solution should be made up to 100 ml]
6. Estimation of Iron in ferrous sulphate solution using a standard solution of ferrous ammonium sulphate and potassium permanganate as link solution. [Test solution should be made up to 100 ml]
7. Comparison of strengths of two potassium permanganate solutions using a standard solution of ferrous sulphate

Water Analysis

8. Estimation of total hardness of a water sample using EDTA.
9. Determination of pH using a pH meter and calculation of hydrogen ion Concentrations in the solutions (For five given samples). (This question may be given to any two students per batch)

INTERNAL ASSESSMENT/RECORD : 25 MARKS
BOARD EXAMINATION : 75 MARKS

VOLUMETRIC ANALYSIS:

FOR	MARKS ALLOTED
SHORT PROCEDURE	05
VIVA – VOCE	05
TITRATION – I	25
TITRATION – II	25
CALCULATIONS	15
TOTAL	75

DETERMINATION OF pH:

FOR	MARKS ALLOTED
ANSWER FOR SHORT QUESTIONS ON pH	05
VIVA – VOCE	05
DETERMINATION OF pH	40
CALCULATION OF $[H^+]$	25
TOTAL	75

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 five given samples using pH meter and calculate the hydrogen ion concentration of the samples. (Any two students per batch).

SCHEME OF EVALUATION

VOLUMETRIC ANALYSIS:

FOR	MARKS ALLOTED
SHORT PROCEDURE	05
VIVA – VOCE	05
TITRATION – I	25
TITRATION – II	25
CALCULATIONS (3 x 5) (Titration - I, Titration - II & Calculations) (For Arithmetic errors 25% Marks may be reduced)	15
TOTAL	75

Titration value accuracy for Titration – I and II:

Accuracy	MARKS
± 0.2 ml	25
above ± 0.2 ml to ± 0.4 ml	21
above ± 0.4 ml to ± 0.6 ml	17
above ± 0.6 ml	5

DETERMINATION OF pH:

FOR	MARKS ALLOTED
ANSWER FOR SHORT QUESTIONS ON pH	05
VIVA – VOCE	05
DETERMINATION OF pH (5 SAMPLES) (5 x 8)	40
CALCULATION OF $[H^+]$ (5 x 5)	25
TOTAL	75

pH value Accuracy:

Accuracy	MARKS
± 0.2	8
above ± 0.2 to ± 0.4	6
above ± 0.4	4

List of Apparatus to be provided for each student in Chemistry Laboratory during the Engineering Chemistry – I Practical Classes/Board Examination in addition to the required Solutions:

Sl.No.	Name of the Item	Quantity (Nos.)
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

FIRST YEAR ENGINEERING CHEMISTRY LABORATORY

LIST OF EQUIPMENTS

LIST OF EQUIPMENTS REQUIRED FOR A BATCH OF 30 STUDENTS

NON-CONSUMBALE ITEMS

Sl.No.	Name of the Item	Quantity (Nos.)
1	LPG Connection	
2	Exhaust Fan (High Capacity)	Sufficient Nos.
3	Fire Extinguisher	1
4	First Aid Box (Full Set)	2
5	Safety Chart	1
6	Chemical Balance	1
7	Fractional Weight Box	1
8	pH Meter	5
9	Working Table with all accessories	8

GLASSWARE AND OTHER ITEMS

Sl.No.	Name of the Item	Quantity (Nos.)
1	Burette (50 ml)	35
2	Burette Stand	35
3	Pipette (20 ml) (With safety Bulb)	35
4	Pipette (10 ml)	5
5	Conical Flask (250 ml)	35
6	Funnel (3”)	50
7	Porcelain Tile	35
8	Measuring Cylinder (10 ml)	5
9	Measuring Cylinder (1000 ml)	2
10	Reagent Bottle (White) (250 ml)	60
11	Reagent Bottle (White) (125 ml)	100
12	Reagent Bottle (Amber) (250 ml)	80
13	Test Tube (15 mm x 1.5 mm)	1000
14	Test Tube (15 mm x 2.5 mm)	500
15	Test Tube Stand	35
16	Test Tube Holder	35
17	Test Tube cleaning brush	35
18	Glass Trough	5
19	Beaker (100 ml)`	35
20	Glass Rod (15 cm)	100
21	Watch Glass (3”)	35
22	Wash Bottle (Polythene)	35
23	Nickel Spatula	35
24	Bunsen Burner for Gas connection	35
25	Plastic Bucket (15 L)	10
26	Filter Papers (Round)	Sufficient Nos.
27	Standard Flask (100 ml)	35