Syllabus for Diploma in Vocation (D.Voc), 1st Semester
Branch: Refrigeration and Air Conditioning
Subject Name: Applied Chemistry Lab
Subject Code: 1210105

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory		Tutorial/ Practical		
L	T	P	C	University exams (ESE)	Progressive Assessment (PA)	External Practical /viva Exam (ESE)	Internal evaluation Practical /viva Exam (PA)	
0	0	2	2	0	0	30	20	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

SUGGESTED LIST OF EXPERIMENTS

S.No.	Unit No.	Experiment	Hrs.
1	1	Find out strength of given acidic solution using standard solution of Base.	02
2	3	Standardize $KMnO_4$ solution by preparing standard oxalic acid and to estimate ferrous ions.	02
3	3	Standardize $Na_2S_2O_3$ solution by preparing standard potassium dichromate and to estimate percentage of copper from brass.	02
4	6	Determine the viscosity of given lubricating oil by using Red-wood viscometer.	02
5	6	To Determine Flash of given lubricating oil.	02
6	2	To Determine PH- Values of given samples of Solution by using Universal Indicator and PH-meter.	02
7	6	Determine molecular weight of a polymer using Ostwald viscometer.	02
8	6	Prepare (anyone) polystyrene, urea formaldehyde, phenol formaldehyde and its Characterization.	02
9	6	Determine Acid Value of given lubricating Oil.	02
10	4	Determine percentage of moisture in given sample of coal by proximate analysis.	02
11	6	Determine of saponification value of a lubricating oil.	02
12	3	Study of corrosion of metals in medium of different pH.	02
13	4	Determine ash content of a given sample of coal.	02
14	6	Determine Fire point of given lubricating oil.	02
15	3	Study of Corrosion of Metals in the different Mediums.	02

Note: Minimum Ten Experiments should be performed by the students from the above given list. Or any other experiments related to above topics.

Suggested Specification Table with Marks (Practical):

Distribution of Practical Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
5	**10**	**10**	**5**	**10**	**10**

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Engineering Chemistry by Jain and Jain Publisher, Dhanpat Rai Publishing Co.
2. Engineering Chemistry by Dr. O. P. Agrawal, Khanna Publishers Delhi.
3. Organic Chemistry by Bahl and Bahl, S Chand & Co. Ltd.
4. Essential of Physical Chemistry by Bahland Tuli, S Chand & Co. Ltd, NRA Delhi.

(b) Open source software and website:

a. www.chemistrytesching.com
b. www.visionlearning.com
c. www.chem1.com
d. www.onlinelibrary.wiley.com
e. www.rsc.org
f. www.chemcollective.org
g. www.wqa.org

List of Laboratory/Learning Resources Required:

1 Electronic Weighing Balance / Digital Weighing Balance (OR Analytical Balance)
2 Hot plate with Magnetic stirrer
3 Digital pH meter
4 Voltmeter
5 Battery: 6 V
6 Ammeter
7 Rheostat
8 Dryer
9 Hot air oven
10 Vacuum Pumps with glass filter
11 Redwood viscometer No.1

12 Stop watch
13 Pensky-Marten's apparatus OR Cleveland open cup OR Abel's flashpoint apparatus

Suggested Project List:

1. Prepare a model of an atom with the help of a ball and stick or of any other items.
2. Prepare a PowerPoint animation that can explain the structure of an atom.
3. Prepare a chart showing (1) Atomic number (Z = e- = p+) 1 to 30, (2) Name of the element, (3) Symbol, (4) Electronic configuration and (5) Condensed Electronic configuration of elements in tabular form.
4. Prepare a chart of the modern periodic table which gives information about the atomic number and mass number of different elements.
5. Form three groups of students in the class. Consider a hypothetical situation of exchanging/ sharing/giving of different items/belongings and demonstrate the type of ionic, covalent, and co-ordinate bonding amongst the students in a simulated situation. Present your findings.
7. Prepare a chart representing compounds and solutions which affect human life positively and negatively.
8. Classify the surrounding corrosion into dry corrosion and wet corrosion.
9. Collect different samples of utensils reinforced materials, iron, copper, brass, bronze, and other alloys. Place them in an open environment under tin shade. Observe the corrosive properties over a period of four weeks. Record your observations. Discuss the findings with your teacher and classmates.

Suggested Activities for Students:

1. Prepare a Power point presentation or animation showing different atomic structures and different types of chemical bonds.
2. Calculate pH of acid solutions and base solutions having different concentrations.
3. Prepare a chart showing different methods used for the prevention of corrosion.
4. Enlist the formulae to solve the numerical based on hardness of water. Calculate the Molecular mass of salts responsible for hardness of water. Show calculations for some numerical based on hardness of water.
5. Prepare a table showing the points of differences between organic compounds and inorganic compounds.
6. Do market survey of different types of lubricating oils and compare their physical properties and chemical properties.
7. Do library survey regarding polymers, synthetic rubbers, adhesives and semiconductors used in different industries.

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