1	Name of Course	**C.C. in Lab Assistant (307108)**
2	Max.Nos. of Student	25 Students
3	Duration	6 Months
4	Type	Full Time
5	Nos Of Days / Week	6 Days
6	Nos Of Hours /Days	7 Hrs
7	Space Required	Laboratory = 1000 Sq feet Class Room = 200 Sq feet **TOTAL = 1200 Sq feet**
8	Entry Qualification	**S.S.C.+ Any Course in Chemical Group of MSBVEE**
9	Objective Of Syllabus/ introduction	Awareness of Safety precautions. Awareness of Fundamental of General Chemistry. Awareness of Physics. Awareness of Unit Operations & Process. Awareness as Lab Assistant.
10	Employment Opportunity	The trainee will either to be able to take up jobs with agencies which Develop, Maintain, Repair Work as Lab Assistant or with working experience will be in a position to start his own independent Business.
11	Teacher's Qualification	Diploma in Chemical Engineering.
12	Training System	Training System Per Week

Theory	Practical	Total
12 Hours	30 Hours	42 Hours

13 Exam. System

Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Min. Marks
1	**30710811**	Lab Assistant	TH-I	3 hrs	100	35
2	**30710821**	Fundamental of General Chemistry, physics & Operation Process..	PR-I	3 hrs	100	50
3	**30710822**	Lab Assistant	PR-II	6 hrs	200	100
		TOTAL			**400**	**185**

SYLLABUS

Lab Assistant

Practical – II	Theory - I
Preparation of Inorganic compounds like Sodium carbonate , sodium bicarbonate Copper sulphate, potassium nitrate etc. To study balance one pan, two pan & digital. To determine flash point of given fuel. To determine physical constant of different liquids/solids. To determine of viscosity given oil To determine surface tension of given liquid. To determine the density of given liquid. To determine the strength of given acid by potentiometer titration using queen hydron electrode To determine the conductivity of given electrolyte. To analyze elements using electrolytic analyzer To determine the PH of given solutions by using PH-meter & lovibond comparator. Paleographic appt. Calorimeters appt. Spectrophotometer appt To determine the concentration of solution by Flam photometer appt. Photo calorimeter appt. To determine the refractive index of given oil. To determine the % of optically active subs. In solutions like glucose/sucrose To determine the moister in given sample. To determine the carbon/sulphar content. To determine the % of various gases in given sample Preparations of, Acetanilide from aniline. Ethyl acetate. Sulphonic acid. Nitrobenzene. Chlorobenzen. Benzoic acid. Glucosazone. Soap preparation. Aspirin. Camphor Phenolphthalein iii) Preparation of camphor xiv) Preparation Phenolphthalein	Inorganic estimations like - estimation of calcium in given tablet etc. Instrumental methods of analysis Balance , Flash point apparatus, Bomb calorimeter Melting / Boiling point apparatus Viscometer Surface tension apparatus Pyknometer Microscope Potentiometer Conduct meter Electrolytic analyzer Cl, H, N, and S Elemental Analyzer PH meter Lovibond comparator Paleographic apparatus Calorimeter Spectrophotometer Photo calorimeter Flame photometer Refract meter (Oil) Polar meter (Sugar) Electrophoresis apparatus Moisture Balance Carbon- sulphur determination apparatus Orsat apparatus Gas - Liquid chromatography Preparation of aluminum silicate Organic preparations (Principle ,Reaction, Procedure and calculation of percentage yield /percentage purity) i) Acylation ii) Esterification iii) Sulphonation iv) Nitration v) Oxidation vi) Reduction vii) Halogenations viii) Diazotization ix) Hydrolysis x) Osazone

To determine acid value, soap value, iodine value. of a given oil sample To estimate, Amt. of tat ,oil. Amt. N2 by kneads method Amt . formally by iodo mettric method. Amt. of aniline ,phenol in a given solution. To analyze the , Given unknown compound by qualitative analysis To determine , % Composition of metals in given alloy. To determine, % Composition of metals in given ores. To analyze the , Given unknown compound by qualitative analysis To determine , % Composition of metals in given alloy. To determine, % Composition of metals in given ores. Spectroscopy - IR, NMR, UV. Spectroscopy. Moisture balance, Carbon, sulphar, determination appt. Gas analyzer ,smoke detector, PH-meter & comparator Trebidity appt. Digital viscometer, Digital balance Preparation Of Media Preparation Of Innocula Preparation Of Stains To determine size of micro-organisms Using electronic microscope. To determine thermal death time. To study of fermentation To study the metabolism of carbohydrate, proteins, lipids, nucleic acid . Study of Ph , Buffer. Study experiments To determine COD, BOD,PH of water.	II .Oil analysis i) Estimation of fat by Soxhlet's extraction method ii) Estimation of nitrogen by Kjedal's method iii) Estimation of formaldehyde by Iodometric method iv) Estimation of Aniline/Phenol IV . Analysis of organic compound to determine a) Elements present b) Functional group c) Melting point / Boiling points d) Preparation of derivative e) Melting point / Boiling point of derivative Balance, eq. Weight, mol weight , at. Weight , sp,gravity, normality, acidity , basicity , concentration. Quantitative analysis A) Alloy analysis * Determination of %composition and purity of alloy * Brass, bronze, solder, stainless steel, gun metal, white metal, bell metal, duralumin etc. B) Ores analysis * Determination of % composition of ores * Hematite, magnetite, bauxite, copper pyrite, lime stone etc. Instrumental methods of Analysis Refract meter Polarograph Polarimeter (Digital) Chromatography - GLC,TLC,HPLC. Electrophoresis Flame Photometer (Digital) Spectroscopy - IR, NMR, UV. Spectroscopy. Moisture Balance Carbon, Sulphur, determination apparatus. Gas Analyser,and Smoke detector Flash point and fire point apparatus PH meter and comparator Turbidity apparatus Digital viscometer Digital balance A) Microbiology
To determine hardness water. To determine TDS, To determine TSS, To Study Sterilization, Sedimentation. To study the cation & anion exchanger	a) Study and use of microscope , common laboratory equipment used in Microbiology b) Preparation of media c) Techniques of inoculations. d) Study of staining techniques e) Determination of size of microorganism f) Determination of Thermal death time of microorganisms

	g) Total plate count of given sample h) Preparation of alcohol in laboratory
	Importance of biochemistry Structure, function and metabolism of carbohydrates, proteins, lipids, nucleic Acid Protein biosynthesis, mechanism of enzyme action Bio chemistry of photo synthesis Basic concept of genetic engineering] PH & buffers C) Biotechnology Cell Constituent, cell division, biochemistry of biological Macromolecules Genetic recombination, structure of genetic code. Transcription and translation of genetic information Molecular mechanism of mutations, innunogenetic, hydro mass, plant tissue culture Life cycle of different kinds of living organism, structure and function of cell, genetic conservation Fermentation and formulation Biotechnology and society Sources of water Water pollutants-organic inorganic, sediments, thermal, Radioactive materials, Biological pollution Sources of water pollution Water quality Treatment of water purification, sedimentation, coagulation, filtration, sterilization Physical and chemical methods of sterilization Physical - electricity, sound,light, heat Chemical-chlorination, electrolysis, reverse cosmoses Water softening (removal of hardness) Boiling Clark's method Distillation Use of caustic soda Ion exchange Effluent Treatment system Effluent- types and sources hods of treatment of effluents Effluent analysis (Ph,COD,BOD,TSS) Permit able standards Equipments used for effluents

Fundamentals of General Chemistry and Physics

Practical - I
To study triangular and parallelogram of force with the help of mechanical board. Determination of coefficient of static friction using inclined plane.
Determination of mechanical advantage velocity ratio and % efficiency of simple machine. Determination of acceleration due to gravity by simple pendulum.
Determination of Young's modulus by Searle's apparatus. Determination of coefficient of expansion of solid and liquid. Determination of coefficient of thermal conductivity of metal rod. Determination of specific rotation of optically active substance by a polarimeter.
To study Ohm's law and Kirchoff's law about current and voltage. To study electric cell using series and parallel connections. Determination of specific resistance using wheat stone's bridge. Verification of Faraday's First Law of electrolysis. Determination of mechanical equivalent of heat using electrical method
Volumetric analysis -> Acidimetric titration ->Alkalimetric titration ->Redox titration -> Precipitation titration. Iodometric titration Complexo metric titration
[A] Preparation of Chemicals -> To study the allotropic forms of sulphur. -> To study the properties of mixture (Fe+ S) and Compound (FeS) -> Preparation of aniline -> Preparation of copper sulphate -> To study Action of pure and salt water on metals and alloys -> To study action of acids and base on metals alloys

List of Tools & Equipment for Laboratory

Sr. No.	Name	**Req. Quantity**
01	Balances (Digital)	**02 Nos.**
02	Flash point apparatus	02 Nos.
03	Melting/boiling point apparatus	02 Nos.
04	Digital viscometer	02 Nos.
05	Surface tension apparatus	02 Nos.
06	Pyknometer	02 Nos.
07	Micro scope	05 Nos.
08	Potentio meter	02 Nos.
09	Conductor meter	02 Nos.
10	Electrolytic analyzer and Cl, H, N, S	01 No.
11	elemental analyzer	Each.
12	P.H.(Digital) meter	02 Nos.
13	Lovibond comparator	02 Nos.
14	Paleographic apparatus	02 Nos.
15	Calorimeter	02 Nos.
16	Spectrophotometer	02 Nos.
17	Photo calorimeter	02 Nos.
18	Flame photometer	02 Nos.
19	Refract meter (Oil)	02 Nos.
20	Polar meter (Sugar)	02 Nos.
21	Electrophoresis apparatus	02 Nos.
22	Moisture Balance	02 Nos.
23	Carbon- sulphur determination apparatus	02 Nos.
24	Gas - Liquid chromatography	02 Nos.
25	Preparation of aluminum silicate	02 Nos.
26	Digital viscometer	02 Nos.
27	Digital moisture balance	02 Nos.
28	Digital PH meter	02 Nos.
29	Digital flame photometer	02 Nos.
30	C.O.D.,B.O.D.,T.S.S. analysis equipment	02 Nos.
31	Turbidity meter	02 Nos.
32	Spectroscopy- IR,NMR, UV spectroscopy	02 Nos.