

B. K. BIRLA COLLEGE OF ARTS, SCIENCE AND COMMERCE
(AUTONOMOUS), KALYAN
Department of Chemistry
Third Board of Studies meeting
Date: 23rd January 2021

The third Board of studies meeting of the department of Chemistry was held on 23rd January 2021.

The following members attended the meeting:

1.	Dr. Vilas R. Khairnar (Head, Dept. of Chemistry, B. K. Birla College, Kalyan)	Chairperson, BOS
2.	Prof. M.M.V. Ramana	V.C. Nominee, Professor and Head, Dept. of Chemistry (Autonomous), University of Mumbai
3.	Dr. R.N. Jagtap Professor and Head, Polymer Engineering and Surface Coatings Technology, ICT, Mumbai	Member BOS, Special invite (Principal's nominee)
4.	Dr. Keshav Singh (Head Corporate Quality Assurance, Parekh Integrated Services, Pvt. Ltd.)	Member BOS, Post graduate illustrious alumni (Principal's nominee)
5.	Mr. K. H. Dongare (Dept. of Chemistry, B. K. Birla College, Kalyan)	Member BOS
6.	Dr. S. V. Jaybhaye (Dept. of Chemistry, B. K. Birla College, Kalyan)	Member BOS
7.	Dr. (Mrs.) S. N. Manchanda (Dept. of Chemistry B. K. Birla College, Kalyan)	Member BOS
8.	Dr. (Mrs.) A. A. Singh (Dept. of Chemistry, B. K. Birla College, Kalyan)	Member BOS
9.	Dr. (Mrs.) P. T. Maskar (Dept. of Chemistry, B. K. Birla College, Kalyan)	Member BOS
10.	Mr. B. V. Pathare (Dept. of Chemistry, B. K. Birla College, Kalyan)	Member BOS
11.	Mr. N. D. Pawar (Dept. of Chemistry, B. K. Birla College, Kalyan)	Member BOS

Agenda of the meeting was as follows:

1. ITEM NO. 1

To approve the syllabus of Chemistry for Undergraduate, Postgraduate and Certificate course and recommended to Academic Council, B. K. Birla College of Arts, Science and Commerce (Kalyan), Kalyan.

2. ITEM NO. 2

Appreciation of Board of Studies members who contributed to prepare syllabus.

3. ITEM NO. 3

Any other item with the permission of Chair

Dr. Vilas R. Khairnar, Head, Dept. of Chemistry, B. K. Birla College, Kalyan and Chairperson of the meeting welcomed the members and introduced them.



ITEM NO. 1

To approve the syllabus of Chemistry for Undergraduate, Postgraduate and Certificate course and recommended to Academic Council, B. K. Birla College of Arts, Science and Commerce (Autonomous), Kalyan.

Draft syllabus of Chemistry for Undergraduate, postgraduate (including M. Sc in Analytical Chemistry) and Certificate course for the year 2021-22 was approved and recommended to Academic Council, B. K. Birla College of Arts, Science and Commerce (Autonomous), Kalyan.

ITEM NO. 1.1 (UG)

ITEM NO. 1.1.1(F.Y.B.Sc.)

Sem I Paper I

Unit I

Review of thermodynamic terms, integral and differential enthalpies of solution and dilution

1.2 Chemical Calculations

1.2.1 Expressing concentration of solutions: Normality, molality, molarity, formality, mole fractions, weight ratio, volume ratio, weight to volume ratio, ppt, ppm, ppb, millimoles, milliequivalents (Numericals expected)

Unit II

Periodicity in Metallic and Nonmetallic behavior and oxidation states

Discussion was held and the syllabus was approved.

Unit III

Nomenclature of Aromatic Compounds: (Halo Arenes, Phenol, amine, ethers, aldehydes and Ketones, Generation, Stability and applications of reactive intermediates Carbenes, Benzyne

F. Y. B.Sc. Sem I (Paper II)

Physical / Unit-I

Additive & Constitutive Properties with suitable examples, Refractive Index, Molar Refraction, Specific Refraction

Inorganic / Unit-II

Introduction (to include economics and importance of corrosion), types of Corrosion, Methods of protection from corrosion.

Organic / Unit-III.

Comparison between D, L and R, S Nomenclature Inversion of Configuration, Retention of Configuration. Difference Between Conformation and Configuration Epimerization and Anomerization with suitable Example.

Practical

1.To Find MSDS sheets of at least two hazardous chemicals ($K_2Cr_2O_7$, Benzene, cadmium nitrate, sodium metal, etc.) & Precautions in handling of hazardous substances like Conc. acids, ammonia, organic solvents, etc.

2.Preparation of buffer solutions Sodium acetate-acetic acid and determine its buffer capacity

ITEM NO. 1.1.2(S.Y.B.Sc.)

Sem III

Paper- I

Physical / Unit-I

hydrolysis constant of salt, Hittorf method

Physical / Unit-II

Deviation from Nernst Distribution law and Fractional distillation method

Analytical / Unit-III

No Change

Paper -II

Inorganic / Unit-I No change

Inorganic / Unit-II

Metalloorganic, carboranes, reactions of organoboranes, Intercalation compounds of graphite, Zeolites, PN and SN Compounds, Applications of PN and SN compounds.

Analytical / Unit-III

Radioanalytical Methods Introduction, Classification of Radioanalytical Techniques Neutron Activation analysis -Principle and Theory Advantages and limitation of NAA, Application.

Paper III

Organic / Unit-I

Organo Zinc Compounds preparation (using alkyl / aryl halide.) and applications (Reformatsky and Simon Smith reaction, Industrial Applications of Phenols, preparation, Per benzoic acid, Sharpless epoxidation reaction, Natural Oil (added)

Organic / Unit-II

Stereochemistry- Molecular chirality and elements of symmetry: Mirror plane symmetry, inversion center, rotation -reflection (alternating) axis. Chirality of compounds without a stereo genic center: cumulenes and biphenyls.

Industrial / Unit-III Crystallization

ITEM NO. 1.1.3(T.Y.B.Sc.)

Sem V

Physical /Paper I

number of modes of vibration for linear and non-linear molecules, conversion of fertile to fissile material, nuclear fusion: Characteristics, Mechanism of nuclear fusion process: (1) Carbon cycle and (2) Proton cycle, Freundlich adsorption isotherm. Colloids: Fats, Oils, Soaps & Detergents

Practical Conductometry: To determine the amount of weak dibasic acid by conductometric titration

Inorganic/ Paper II

Ionic liquids: synthesis and applications

Organic / Paper III

Stereochemistry- Cycloalkanes and Conformational Analysis, Types of cycloalkanes and their relative stability, Baeyer strain theory, Conformation analysis of cyclohexane: Chair, Boat and Twist boat forms; Relative stability with energy. Stereochemistry of mono and disubstituted cyclo alkanes and their relative stability.

Green Synthesis Methods, (Physical, chemical methods and Biological) Ball Milling, Microwave, Ultrasound-assisted (sonochemical) synthesis. with examples

Green Synthesis of Nanoparticles (ZnO) and their applications in Photocatalysis stability.

Analytical / Paper IV

Quality in Analytical Chemistry-

Concepts of Quality, Quality Control and Quality Assurance, Importance of Quality concepts in Industry Chemical Standards and Certified Reference Materials; Importance in chemical analysis Quality of material: Various grades of laboratory reagents good laboratory practices .ISO series, Chemical Calculations (Numerical and word problems are expected) Inter conversion of various concentration units.(Molarity, Normality, Molality, mole fraction, Concentration in ppm etc.) Percent composition of elements in chemical compounds.

Practical Added-Estimation of water crystallization in Mohr's salt by titrating with KMnO_4 .

Drugs & Dyes/ Paper V

Anti- Covid Drug, Introduction, Types of Corona-Virus, Symptoms, Testing for Corona virus, difference between isolation and quarantine Transmission, Effect on the body and Prevention

F.Y. B.Sc. SEM- II

Paper I

Physical / Unit-I

critical phenomena, critical constants and their calculation from van der Waals's equation, Chemical Equilibria: (Restructuring), Reversible and irreversible reactions, law of mass action, equilibrium constants, (K_c and K_p), relationship between K_c and K_p , Le Chatelier's Principle, factors affecting chemical equilibrium (Numerical expected).

Inorganic / Unit-II No change

Organic / Unit-III

Nomenclature of Heterocyclic aromatics (Pyridine, Pyrrole, Furan and Thiophene)

Oxidation of Alkenes and Alkynes using Per acid and Enzymatic or microbial oxidations (Bio-oxidations)

Paper II

Physical / Unit-I No change

Inorganic / Unit-II

Alloys (Added) Definition, Types, Methods of preparation, properties such as melting point, hardness, electrical conductivity, tensile strength. Composition and applications of some important alloys.

Organic / Unit-III

Aliphatic Electrophilic Substitution, Unimolecular mechanism ($\text{S}_\text{E}1$), Bimolecular mechanism ($\text{S}_\text{E}2$ and $\text{S}_\text{E}i$) Halogenation of aldehyde and ketones, Halogenation of carboxylic acids Nitrosation at carbon (C-nitrosation).

Practical Synthesis of commercially important inorganic compounds 1) Mohr's Salt

2) $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$

S. Y. B. Sc. Sem IV

Paper I

Physical / Unit-I Added: Ion selective electrodes and their use

Physical / Unit-II Added: Weiss & Miller indices - with reference to numerical

Analytical / Unit-III No Change

Paper II

Inorganic / Unit-I No Change

Inorganic / Unit-II Biochemistry: Ca in Blood coagulation and Iron in Ferritin (Added)

Analytical / Unit-III Added- Size Exclusion Chromatography-Introduction Principle, instrumentation and application

Paper III

Organic / Unit-I

Added: Acyloin Condensation, Application in Dyes, Drugs and Detergents, Uses of Carbohydrates in living organisms.

Organic / Unit-II No Change

Industrial / Unit-III No Change

Practical Estimation of Fe (III) from given solution by converting it to Fe (II) using Zn metal and then by titrating with standard solution of $\text{K}_2\text{Cr}_2\text{O}_7$ -A Green Approach (Added)

-Estimation of water crystallization in Mohr's salt by titrating with KMnO_4 .

T. Y. B. Sc. Sem VI

Physical / Paper I

Unit-I Added: Expressions for each type of cells Determination of liquid junction potential

Unit-II Added: Biodegradable Polymers & Bio polymers – examples

Unit-III Added: Postulates of Quantum Mechanics: (4) Wave mechanical operator for evaluating various classical properties (5) Expectation value

Unit-IV Added: High- & low-resolution spectra of ethanol, methanol

Practical Added: (1) Chemical Kinetics: To determine the energy of activation for the acid catalysed hydrolysis of methyl acetate

(2) pHmetry: To determine pK_1 and pK_2 of phosphoric acid pH-metrically

Organic/ Paper III

Unit-I

Protecting groups in Organic Synthesis: Protection and deprotection of the hydroxyl, carbonyl, amino and carboxyl functional groups and its applications

Unit-II Added: Commercial importance of Carbohydrates in pharmaceutical, paper, food and textile industries.

Unit-III Classification of IR and Fundamental of vibrational modes (to be added) aldehydes and ketones compounds (added).

Unit-IV Polymer Nanocomposite: Definition, Structure, methods of preparation and applications. (added)

Analytical /Paper IV

Unit-I No change

Unit-II Errors in Analysis and their types, Correction for determinate Errors, precision & Accuracy in Analysis Nature of Indeterminate Errors: The true and acceptable value of a result of analysis Measures of central tendency: mean, median, mode, average Measures of dispersion: Absolute deviation, relative deviation, relative average deviation, standard deviation, (sigma) variance, coefficient of variation. Distribution of random errors, Criteria for rejection of doubtful result

Unit-III Added-To determine the indicator constant of methyl red indicator by using colorimetry

Unit-IV Added-Atomic Force Microscopy-Introduction, Basic principle, Instrumentation Application

Drugs & Dyes /Paper V

Unit-I Synthesis Amoxicillin from 6-aminopenicillanic acid History of pandemics, Precautions, Vaccines and Treatments for COVID-19, Virus detection and antiviral kits

ITEM NO. 1.1.4 (M. Sc I)

M.Sc. Part I Sem I

Organic /Paper III

Unit-I Added-hard and soft acid and base concept.

Unit-II No Change

Unit-III Added-Stereochemical Principles, Stereospecific and Stereoselective reactions

Unit-IV Applications of NMR in medicine (Introduction, to MRI) (Added)
X-Ray Radiation, X-Ray Absorption, Diffraction Geometry, Bragg's Law, Reciprocal Lattice, Diffraction Intensity, Structure Extinction, X-Ray Diffractometry, Calculations of Crystallite Size, Applications, Crystal-Phase Identification. (Added)

Organic, Paper III

Unit-I No Change

Unit-II No Change

Unit-III Structure determination involving individual or combined use of the UV, IR, NMR

Unit-IV Structure determination involving individual or combined use of the UV, IR, NMR and CMR Mass spectral techniques

ITEM NO. 1.1.5 (M. Sc II)

- In addition to existing PG course, discussion on the syllabus of new M. Sc in Analytical Chemistry program was also held and approved.

ITEM NO. 1.1.6 (Certificate Courses)

Discussion was held and the syllabus was approved.

It was resolved as under,

Resolved that the syllabus of Chemistry in Item No. 1.1.1 to Item No. 1.1.6 be approved and recommended to Academic Council, B. K. Birla College of Arts, Science and Commerce (Autonomous), Kalyan.

ITEM NO. 2

Appreciation of Board of Studies members who contributed to prepare syllabus

The Chairperson reported the members about the efforts of all the members of Board of Studies to prepare the syllabus of the subject of Chemistry for the F.Y., S.Y., T.Y. B.Sc. and M. Sc. Part I and II (Organic Chemistry & Analytical Chemistry) and Certificate course from the academic year 2021 - 22.

Resolved that the Appreciation of Board of Studies members who contributed to prepare syllabus be noted and suggested to incorporate more innovative changes in the next academic year.

Evaluation methods, examination pattern, theory and practical question paper patterns were acceptable to all.

There being no other matter the meeting was concluded with a vote of thanks to the Chair.

Sd/-
(Dr. Vilas R. Khairnar)
Head, Dept. of Chemistry and
Chairperson, BoS

