Part A Introduction			
Program: Diploma	Class: B.Sc.	Year:Second	Session:2022-23
Subject: Botany			

1	Course Code	S2-BOTA2T
2	Course Title	Industrial Botany
3	Course Type (Core Course/Elective/Generic Elective/Vocational/....)	Major-2 / Minor / Elective
4	Pre-requisite (if any)	The course is open to all who have completed I year certificate course in botany and other subjects
5	Course Learning outcomes (CLO)	• This course will provide knowledge on plants and their parts used in various industries. • Students will get an idea to establish plant based natural product industry. • This course will make the students self-reliant.
6	Credit Value	4 Credits
7	Total Marks	Max. Marks: 30+70 / Min. Passing Marks:33

Part B- Content of the Course

Total No. of Lectures- 60 Hours Tutorials- 0 Practical =0 (theory 2 hours per week):

L/T/P:

Unit	Topics	No. of Lectures
I	1 Plants in Timber Industry: 1.1 Timber yielding trees of India and their products (Shisham, Sal, Teak, Deodar, Babool). 1.2 Bamboo and Cane Industry. 1.3 Kattha' Industry.	12
II	Leaf Based Industries- 1.1 Utility products of leaf (Palash, Banana). 1.2 Tea Industry (Production of various types of teas). 1.3 Leaf oil Industry (Mint, Camphor, Neem, Tulsi, Eucalyptus and Lemon grass). 1.4 Leaves used as spices (Kasoori Methi, Pudina, Curry patta, Onion , Tejpatta).	12
III	Flower based Industries – 1.1 Perfume products of Gulab, Jasmine, Henna, 1.2 Color industry (Food and Holi colors). 1.3 Raw material for Fermentation (Mahua).	12
IV	Fruits and Seedsbased Industries-	12

Syllabus of Practical Paper

Part A Introduction				
Program: Diploma		Class: II year	Year: 2022	Session: 2022-23
Subject: Botany				
1	Course Code	S2BOTA2P		
2	Course Title	Industrial Botany / Practical		
3	Course Type (Core Course/Elective/Generic Elective/Vocational/.....)	Major-2 / Minor / Elective		
4	Pre-requisite (if any)	To study this course, a student must have the subject Botany, Biology, Life Science in First Year/Certificate.		
5	Course Learning outcomes (CLO)	• students will be able to recognize different parts of plants used in plant-based industries • This course will provide practical knowledge to establish small or large scale plant based industries		
6	Credit Value	2 Credits		
7	Total Marks	Max. Marks: 30+70 =100	Min. Passing Marks:33	

Part B- Content of the Course

Total No. of Lectures-00 Tutorials-00 Practical 30 Hours (02 hours per week): L-T-P:

Unit	Topics	No. of Lectures
I-V	1. Preparation of Holi color's from locally available flowers 2. Preparation of food colors from locally available flowers 3. Perfume extraction process by distillation method 4. Preparation and preservation techniques of jams, jellies and prickles. 5. Extraction and preservation of juices (lemon and orange etc.) 6. Preparation of different types of teas (Tulsi tea, lemon tea	30

B.Sc. II Year Chemistry Syllabus
CBCS Annual Pattern
From Academic Year 2022-2023
Chemistry-NEP (2020)

Part A Introduction				
Program: Diploma		Class: B. Sc.	Year: Second	Session: 2022-2023
Subject: Chemistry				
1	Course Code	S2-CHEM2T		
2	Course Title	Transition Elements, Chemi-energetics, Phase Equilibria (Paper 2)		
3	Course Type (Core Course/Elective/Generic Elective/Vocational/.....)	Core Course		
4	Pre-requisite (if any)	To study this course the students must have had the subject Chemistry in 12th Class or Subject Chemistry in Certificate Course of B. Sc.		
5	Course Learning outcomes (CLO)	By the end of this course students will learn the following aspects of Chemistry: • Introductory idea about Traditional Indian Chemistry • Chemistry of d- & f-block Elements, Basic Concepts of Coordination Chemistry. • Stereochemistry of Transition Metal Complexes. • Laws of Thermodynamics. • Concept of Phase Equilibrium with reference to Solid Solution, Liquid-Liquid Mixtures, Partially Miscible Liquids. • Basic Concepts of Electrochemistry.		
6	Credit Value	4 (Theory)		
7	Total Marks	Max. Marks: 100 30 CCE +70 UE		Min. Passing Marks: 33

Part B- Content of the Course		
Total No. of Lectures-Tutorials-Practical (in hours per week): 2 hours per week (L-T-P: 2-0-0) Total No. of Lectures: 60		
Unit	Topics	No. of Lectures
1	**Knowledge Tradition of Indian Chemistry** Ancient Indian chemists and their works: Nagarjuna, Vagbhata, Govindacharya, Yashodhara, Ramchandra, Somadeva, etc. **Introductory idea about rasas** Main rasa: Maharas, Uparas, Common ras, Ratna, dhatu, poison, alkali, acid, salt, lauhabhasma. Maharas: Abram, Vaikrant, Bhasik, Vimala, Shilajatu, Sasak, Chapala,	2

	Rasak. **Uparas:** Gandhak, Garik, Kashis, Suvari, Lalak, Manah, Shila, Anjana, Kankushtha. **Common Rasa:** Koyla, Gauripashan, Navasara, Varataka, Agnijar, Lajavarta, Giri Sindoor, Hingul, Murdad Shrangakam.	
	Chemistry of d- & f-block elements 1. **Chemistry of Transition elements:** First, Second and Third Transition series General group trends with special reference to- Electronic Configuration, Coordination Geometry, Colour, Variable Valency, Spectral, Magnetic and Catalytic Properties, Ability to form Complexes. 2. **Chemistry of Inner Transition elements:** Lanthanides and Actinides General group trends with special reference to Electronic Configuration, Oxidation States, Colour, Spectral and Magnetic Properties. Lanthanide Contraction. Separation of Lanthanides (Ion-exchange method only). 3. **Transuranic elements:** General Introduction. *Keywords/Tags: Knowledge Tradition of Indian Chemistry, Transition elements, Spectral Properties, Magnetic Properties, Catalytic Properties, Lanthanide Contraction.*	10
2	**Coordination Chemistry** **1. Structures, Stereochemistry and Metal-Ligand Bonding in Transition Metal Complexes** Werner theory for complexes. Electronic interpretation by Sidwik. **Valence Bond Theory** (VBT)- Postulates and applications for Tetrahedral, Square planar and Octahedral complexes. Limitations of VBT. **Crystal Field Theory (CFT)**- Postulates and application: Crystal field splitting of d-orbitals. Crystal field stabilisation energy (CFSE) in Tetrahedral, Square planar and Octahedral complexes, CFSE of weak and strong fields. Factors affecting the crystal field parameters. Measurement of 10 Dq (Δ_0) and factors affecting its magnitude. Comparison of octahedral and tetrahedral coordination. Tetragonal distortions from octahedral geometry. Jahn-Teller theorem. Square planar geometry. Limitations of CFT. Qualitative aspect of Ligand field and Molecular Orbital (MO) Theory. Spectrochemical and Nephelauxetic series. Coordination number, coordination geometries of metal ions, types of ligands. **2. Isomerism in coordination compounds:** **Structural isomerism**- Ionization, Linkage, Coordination-Ligand Isomerism. **Stereo isomerism:** Geometrical isomerism: Square planar metal complexes of type-[MA2B2], [MA2BC], [M(AB)2], [MABCD]. Octahedral metal complexes of type- $[MA_4B_2]$, $[M(AA)_2B_2]$, $[MA_3B_3]$. Optical isomerism: Tetrahedral complexes of type- [MABCD]. Octahedral complexes of type- $[M(AA)_2B_2]$, $[M(AA)_3]$.	12

	Keywords/Tags: Stereochemistry of complexes, VBT, CFT, CFSE.	
3	**Thermodynamics** **1. First law of Thermodynamics** Concept of heat (Q), work (W), internal energy (U), Statement of first law, Enthalpy (H), Relation between heat capacities. Calculations of Q, W, ΔU and ΔH under isothermal and adiabatic conditions for Reversible, Irreversible and Free (ideal and van der Waals) expansions of gases. Joule Thomson effect and its theory, Inversion temperature. **2. Second Law of Thermodynamics** Carnot cycle, Statement of the second law of thermodynamics. Concept of Entropy, Calculation of entropy change for Reversible and irreversible processes, Concept of residual entropy. Free Energy Functions: Gibbs and Helmholtz energy. Variation of entropy (S), Gibbs free energy (G), work function (A) with temperature (T), volume (V) & pressure (P). Free energy change and spontaneity, Gibbs-Helmholtz equation. **4. Third Law of Thermodynamics** Nernst heat theorem and its significance, Statement of third law, Calculation of absolute entropy of substance. *Keywords/Tags: Thermodynamics, Laws of Thermodynamics, Carnot cycle, Enthalpy, Free Energy.*	12

Syllabus of Practical Paper

Part A Introduction

Program: Diploma	Class: B. Sc.	Year: Second	Session: 2022-23

Subject: Chemistry

1	Course Code	S2-CHEM2P	
2	Course Title	Metal Complex Preparation, Thermochemistry & Phase equilibria experiments (paper 1)	
3	Course Type (Core Course/Elective/Generic Elective/Vocational/.....)	Core Course	
4	Pre-requisite (if any)	To study this course the students must have had the subject Chemistry in 12th Class or Subject Chemistry in Certificate Course of B. Sc.	
5	Course Learning outcomes (CLO)	By the end of this course students will learn the following aspects of laboratory exercises of Chemistry: • Preparation of inorganic complexes. • Use of calorimeter for thermochemistry experiments. • Determination of enthalpy of various systems and reactions. • Experiments on phase equilibria. • Construction of phase diagrams. • Study of reaction equilibrium.	
6	Credit Value	2 (Practical)	
7	Total Marks	Max. Marks: 30+70	Min. Passing Marks:33

Part B- Content of the Course

Total No. of Practical (in hours per week): 02
L-T-P: 0-0-2 (Total Hours 30)

Section	Topics	No. of Lectures
A	Preparation of Inorganic Complexes: • Tetraammine copper (II) sulphate • Copper (II)acetylacetonate complex • Iron (III) acetylacetonate • Tetraamminecarbonatocobalt (III) nitrate • Potassium tri(oxalato)ferrate(III) • Nickel(II) dimethylglyoximate	12
B	Thermochemistry (a) Determination of heat capacity of a calorimeter using following experiments- (i) Change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution of sulphuric acid or enthalpy of neutralization) (ii) Heat gained by cold water is equal to heat lost by hot water. (b) Determination of enthalpy of following:	24

PART A: Introduction			
Program: **Diploma**	Class: **B.Sc.**	Year: **II Year**	Session: **2022-23**
Subject: **Computer Science**			

1.	Course Code	**S2-COSC2T**	
2.	Course Title	**Object Oriented Programming with Java**	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Core Course – (Major – II) / Minor / Elective**	
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming Methodology at Certificate Level.	
5.	Course Learning Outcomes(CLO)	**After the completion of this course, a successful student will be able to do the following:** 1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. 2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to a specific problem. 3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved. 4. Demonstrate understanding and use of different exception handling mechanisms and concepts of multi-threading for robust faster and efficient application development. 5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events. 6. Identify, Design & Develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.	
6.	Credit Value	**Theory - 4 Credits Practical – 2 Credits**	
7.	Total Marks	Max. Marks : **30+70**	Min. Passing Marks: **33**

Abhilasha Kumar
Chairman, Central Board of Studies, Computer Science

PART B: Content of the Course		
No. of Lectures (in hours per week): **2 Hrs. per week**		
Total No. of Lectures: **60 Hrs.**		
Module	**Topics**	**No. of Lectures**
I	**OOPS** - Object Oriented Paradigm, Benefits of OOP, Applications of OOP. **Java** - History, Java Features, How Java Differs from C and C++, Java and internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Supports Systems, Java Environment. **Java Program Structure** - Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, and Programming Style. **Keywords:** OOPS, JVC, WWW, Java Environment	12
II	**Java Basics** -Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variable, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values. **Operators** - Arithmetic Operator, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, **Arithmetic Expressions** - Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions. **Decision Making** with if Statement, Simple if Statement, if……Else Statement, Nesting of if …else Statement, if-else Ladder, The Switch Statement, The ? Operator. **Loops** - While Statement, Do Statement, For Statement, Jump in Loops, Labeled Loops. **Keywords:** Operators, Arithmetic Expressions, Decision Making, Loops	12
III	**Class** - Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, **Constructors** – definition and types, Methods Overloading, Static Members, Nesting of Methods. **Inheritance** - Extending a Class, Overloading Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract Methods and Classes, Visibility Control Arrays, One Dimensional Array, Strings, Vectors, Wrapper Classes. Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables. **Keywords:** Class, Constructors, Inheritance, Final, Abstract Methods,	12

Abhilasha Kumar
Chairman, Central Board of Studies, Computer Science

PART A: Introduction				
Program: **Diploma**		Class: **B.Sc.**	Year: **II Year**	Session: **2022-23**
Subject: **Computer Science**				
1.	Course Code	**S2-COSC2P**		
2.	Course Title	**Java Programming Lab**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Core Course - (Major- II) / Minor / Elective**		
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming Methodology at Certificate Level.		
5.	Course Learning Outcomes(CLO)	**After the completion of this course, a successful student will be able to do the following:** 1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. 2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to a specific problem. 3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved. 4. Demonstrate understanding and use of different exception handling mechanisms and concepts of multi-threading for robust faster and efficient application development. 5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events. 6. Identify, Design & Develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.		
6.	Credit Value	**Practical – 2 Credits**		
7.	Total Marks	Max. Marks : **100**	Min. Passing Marks: **33**	

Abhilasha Kumar
Chairman, Central Board of Studies, Computer Science

PART B: Content of the Course		
No. of Lab. Practicals (in hours per week): **1 Hr. per week**		
Total No. of Lab.: **30 Hrs.**		
	Suggestive List of Practicals	**No. of Labs.**
	(Using any Text editor: Notepad/Eclipse/Netbeans/Sublime etc.) 1. Find greater number between two numbers -using conditional operator. 2. Find the factorial of number if number is given by user using command line argument. 3. Write a program to check if a number is prime or not. 4. Write a program to display tables from 2 to 10. 5. Write a program to print Fibonacci series. 6. Enter a no. and check whether it is even or odd. 7. Write a Program to find sum & average of 10 no. using arrays. 8. Write a program to display reverse of a digit no. using array. 9. Write a program to demonstrate function overloading. 10. Write a program to display grade according to the marks obtained by the student. 11. Write a program to calculate the salary of an employee if salary is greater than or equal to 20000 and year of service is greater than or equal to 5 years then bonus will be 2000 otherwise 1000 and print grass salary of employee. 12. Write a program to convert the given no. of days into months & days using with classes, objects and method. 13. Write a program to convert given string into Uppercase and lowercase	30

Part A Introduction			
Program: Diploma Course	Class: B.A./B.Sc. II Year	Year: 2022	Session: 2022-23
Subject: Mathematics			
1	Course Code	S2-MATH2T	
2	Course Title	Advanced Calculus and Partial Differential Equations	
3	Course Type	Major – 2/Minor/Elective	
4	Pre-requisite (if any)	To study this course, a student must have had the subject Mathematics in Certificate Course or equivalent.	
5	Course Learning Outcomes (CLO)	The course will enable the students to: 1. Understand many properties of the real line R and sequences. 2. Calculate the limit superior, the limit inferior, and the limit of a bounded sequence. 3. Apply the mean value theorems and Taylor's theorem. 4. Apply the various tests to determine convergence and absolute convergence of an infinite series of real numbers. 5. Formulate, classify and transform partial differential equations into canonical form.	
6	Credit Value	Theory: 6	
7	Total Marks	Max. Marks: 30 + 70	Min. Passing Marks: 10 + 23

Part B - Content of the Course		
Total No. of Lectures (in hours per week): 3 hours per week Total Lectures: 90 hours		
Unit	Topics	No. of Lectures
I	1.1 Historical background: 1.1.1 A brief historical background of Calculus and partial differential equations in the context of India and Indian heritage and culture 1.1.2 A brief biography of Bodhayana 1.2 Field structure and ordered structure of R, intervals, bounded and unbounded sets, supremum and infimum, completeness in R, absolute value of a real number. 1.3 Sequence of real numbers 1.4 Limit of a sequence 1.5 Bounded and monotonic sequences 1.6 Cauchy's general principle of convergence 1.7 Algebra of sequence and some important theorems	18

Name of BOS: Mathematics
Date: 15.02.2022

Signature of the Chairman (BOS):
Name: Dr. Anil Rajput

II	2.1 Series of non-negative terms 2.2 Convergence of positive term series 2.3 Alternating series and Leibnitz's test 2.4 Absolute and Conditional Convergence of Series of real terms 2.5 Uniform continuity 2.6 Chain rule of differentiability 2.7 Mean value theorems and their geometrical interpretations	18
III	3.1 Limit and continuity of functions of two variables 3.2 Change of variables 3.3 Euler's theorem on homogeneous functions 3.4 Taylor's theorem for functions of two variables 3.5 Jacobians 3.6 Maxima and Minima of functions of two variables 3.7 Lagrange's multiplier method 3.8 Beta and Gamma Functions	18
	4.1 Partial differential equations of the first order	

Part A – Introduction			
Programme:Diploma	**Class: B.Sc.**	**Year: Second Year**	**Session:2022-23**
Subject: Microbiology			

1	**Course Code-**	**S2-MBIO2T**	
2	**Course Title**	**Microbial Diversity and Growth**	
3	**Course Type**	**Core Course (Major I/ Minor/ Elective)**	
4	**Pre-requisite (if any)**	**To study this course, a student must have had the subject Microbiology in certificate course.**	
5	**Course Learning outcomes (CLO)**	On completion of this course, learners will be able to - • Classify bacteria into groups and their salient characteristics. • Describe the nutritional requirements of bacteria for growth. • Understand viruses and viral diseases. • Know about diversities in Fungi and Algae • Develop a basic idea about Protozoa .	
6	**Credit Value**	4	
7	**Total Marks**	Max. Marks-30+70	Min Passing Marks-33

Total No. of Lectures: 60

Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0

Unit	Topics	No. of Lectures
1	**Virology** **1.1** Discovery of viruses, general properties, concept of viroids, virusoids, satellite viruses and Prions. Concept of Theories of viral origin- Progressive, Regressive and The Virus-first theory. Structure of Viruses. Salient features of viral nucleic acid and the presence of unusual bases. Influenza and Hepatitis B virus, HIV, Polio virus, Vaccinia virus, Rabies Virus. TMV, Cauliflower Mosaic Virus, Bacteriophage **1.2Viral taxonomy:** Classification and nomenclature of different groups of viruses. Baltimore system of classification. **1.3Modes of viral transmission:** Persistent, non- persistent, **1.4 Replication:** Assembly, maturation and release of viruses in Lytic and lysogenic cycles. *Key words- virus,classification of virus, replication of virus, Viral Diseaeses*	**15**
2	**Archaebactria and Eubacteria** **2.1** General characteristics. Phylogenetic overview of archaebacteria. Differences between Eubacteria and Archaebacteria.Classification of Bacteria - Outline of Bergey's Manual of Systematic Bacteriology. General accounts of Mycoplasma, Actinomycetes, Rickettsias, Chlamydia and Cyanobacteria. Nutritional requirements in bacteria and nutritional categories. **2.2 Bacterial Growth-** Logarithmic representation of bacterial populations, phases of growth, calculation of generation time and specific growth rate. Techniques of Measurement of bacterial growth, Factors affecting Bacterial growth *Key words- Archaebacteria, Bergey's manual, Bacterial Growth*	**15**

Part A – Introduction			
Programme: Diploma	Class: B.Sc.	Year: II	Session:2022-23
Subject- Microbiology			

1	Course Code-	S2-MBIO2P	
2	Course Title	Isolation and Growth Study of Microorganisms (Practical)	
3	Course Type	Core Course (Major I/ Minor/ Elective)	
4	Pre-requisition	To study this course a student must have had the subject Microbiology in certificate course	
5	Course Learning outcomes	On completion of this course, learners will be able to – • Define the nutritional requirements of bacteria for growth. • Understand virus and viral diseases. • Know about diversities in habitats of fungi and algae. • Develop a basic idea about Protozoa .	
6	Credit Value	2	
7	Total Marks	Max. Marks-30+70	Min Passing Marks-33

Total No. of Lectures-30

Tutorials-Practical (in hours per week): L-T-P: 0-0-2

S. No.	Name of the Exercise	No. of Lab Hours
1	Gram staining	2
2	Acid fast staining	2
3	Isolation of bacteria from soil, water and air.	6
4	Isolation of fungi from soil, water and air.	6
5	Isolation of algae from water.	3
6	Identification of common Bacteria, Fungi and Phytoplanktons	4

Part A - Introduction			
Program: Diploma	**Class:** B.Sc.	**Year:** Second	**Session:** 2022-2023
Subject: Physics			

.1.	**Course Code**	S2-PHYS2T
2.	**Course Title**	**Electricity Magnetism and Electromagnetic theory (Paper 2)**
3.	**Course Type (Major/ Minor/Elective/Generic Elective/Vocational/...)**	Major - 2, Minor and Elective
4.	**Pre- requisite (If any)**	To study this course, the student must have passed B.Sc. first year with Physics.
5.	**Course Learning Outcomes (CLO)**	After the completion of the course, the student should be able to 1. Understand the basic concepts of electricity and magnetism and their applications. 2. Apply various network theorems and their applications in electronics, electrical circuit analysis, and electrical machines. 3. Understand the construction and working of ballistic galvanometer and cathode ray oscilloscope. 4. Understand the concept of electromagnetic waves and their reflection and refraction from a plane surface.
6.	**Credit Value**	4
7.	**Total Marks**	Max. Marks: 30+70 | Min. Passing Marks: 33

Part B - Content of the Course

Total number of Lectures (in hours): 60

Unit	Topics	Number of Lectures
I	**Electrostatics** 1. An overview of thermal and hydroelectric power plants in Madhya Pradesh. 2. Electrostatic field; Electric flux; Gauss's theorem of electrostatics; Applications of Gauss theorem: Electric field due to infinite long charged wire; Uniformly charged spherical shell and solid sphere; Charged plate; Conservative nature of electrostatic field; Laplace and poisons equations; Uniqueness theorem. 3. Dielectrics; Polar and non-polar molecules; Parallel plate capacitor with a dielectric; Electrical susceptibility and	12

	dielectric constant; Polarization and Polarization vector (**P**), Displacement vector (**D**), Intensity of Electric field (**E**). Relationship between **D**, **E** and **P**. 4. Gauss's law in dielectrics; Clausius-Mossotti relation, Langevin-Debye formula; Ferroelectric and Paraelectric materials; Hysteresis loop for ferroelectrics. **Keywords/Tags:**. Hydroelectric power plant, Electrostatic field, Dielectrics, Polarization vector, Displacement vector.	
II	**Magnetostatics** 1. Lorentz force equation and magnetic field B; Bio-Savart's law; Calculation of magnetic intensity H for solenoid and anchor ring. 2. Ampere's circuital law and its applications for solenoid and Toroid; Basic law of magnetostatics in differential form $\nabla.B=0$, $\nabla XB=\mu_0 J$; Free and bound currents; Magnetization and magnetization vector **M**; Magnetic permeability and susceptibility; Derivation of $\nabla XM=J_b$ for a non-uniformly magnetized substance; Relationship between **B**, **H** and **M**. 3. Diamagnetic, Paramagnetic and Ferromagnetic substances; B-H Curve and Hysteresis loss. 4. General idea about AC and DC motors, Motor winding. **Keywords/Tags:** Magnetic field, Magnetization, Hysteresis loss, Motor winding.	**12**
III	**Current electricity** 1. Network theorems: Concept of ideal current and voltage sources; Thevenin's theorem; Norton's theorem; Millman's theorem; Maximum power transfer theorem. 2. Transient current: Growth and decay of current in LR circuit; Charging and discharging of a capacitor through resistor; Measurement of high resistance by leakage; Charging and discharging of a condenser through an inductance and resistance. 3. Alternating currents: Complex number and their applications in alternating current circuits (RL, RC and LC); Series LCR (acceptor) and parallel LCR (rejector) circuits; Power factor 4. A.C. bridges: Maxwell's bridge; Owen's bridge; Anderson's bridge; Kelvin's bridge. **Keywords/Tags:** Network theorems, Transient current, A.C. bridges.	**12**

Part A - Introduction			
Program: Diploma	Class: B.Sc.	Year: Second	Session: 2022-2023
Subject: Physics			

1.	Course Code	S2-PHYS2P
2.	Course Title	Electricity Magnetism and EMT Lab (Paper 2)
3.	Course Type (Major/ Minor/Elective/Generic Elective/Vocational/...)	Major- 2, Minor and Elective
4.	Pre- requisite (If any)	To study this course, the student must have passed B.Sc. first year with Physics.
5.	Course Learning Outcomes (CLO)	After the completion of the course, the student should be able to 1. Verify various laws in electricity and magnetism such as Lenz's law, Faraday's law. 2. Understand the construction, working and uses of various measuring instruments. 3. Verify various network theorems, using simple electric circuits.
6.	Credit Value	2
7.	Total Marks	Max. Marks: 100 / Min. Passing Marks: 33

Part B - Content of the Course		
Total numbers of Practical (in hours): 60		
Sr. No.	List of experiments	Number of Practical (in hours)
1.	To draw the B-H curve and determination of Hysteresis loss.	60
2.	Determination of voltage, frequency and phase difference using CRO.	
3.	Study of sensitivity of CRO.	
4.	Verification of the Thevenin's theorem.	
5.	Verification of the Norton' s Theorem.	
6.	Verification of the maximum power transfer theorem.	
7.	Verification of the superposition theorem.	
8.	Measurement of self-inductance using Maxwell's bridge.	
9.	Measurement of unknown inductance using Kelvin's bridge.	
10.	Determination of self-inductance by Anderson's bridge.	
11.	To study of the charging and discharging of a condenser through a resistor.	

Theory Syllabus

Part A- Introduction				
Program : Diploma		Class:B. Sc.	Year: II Year	Session: 2022 - 23
Subject: Zoology				
1	Course Code	S2-ZOOL2T		
2	Course Title	Physiology and Biochemistry (Paper II)		
3	Course Type (Core Course/Elective/Generic Elective/Vocational.....)	Core course		
4	Pre-requisite (if any)	To study this course, a student must have had the Subject Zoology in class B.Sc. I year /certificate.		
5	Course Learning outcomes (CLO)	Upon completion of the course, Students will be able to 1 Understand how organs function at different levels i.e. from cellular to system levels. 2 Examine internal harmony of different body systems by learning inherent disorders and deficiencies, which is needed to maintain good health. 3 Understand functions of biomolecules & their role in metabolism by studying biochemistry. 4 Develop a strong foundation for research & employability skills 5 Improve the student's perspective of health biology through deep study of physiology.		
6	Credit Value	4		
7	Total Marks	Max. Marks: 30+70	Min. Passing Marks : 33	

Part B – Content of the Course		
Total No. of Lectures-Tutorials-Practical : (2 Hours per Week) L-T-P : No. of Lectures= 60		
Unit	Topics	No. of Lectures
I	Introduction and Historical background of Physiology and Biochemistry Biomolecules and Regulatory mechanism. 1. Contribution of Indian Scientists 1.1 Contribution of Charak 1.2 Contribution of Sushrut 2. Biomolecules 2.1 Micro and Macro molecules 2.2 Water and Buffer System 3. Enzymes 3.1 Definition and General Properties 3.2 Nomenclature and Classification and functions 3.4 Mechanism and Regulation of Enzyme action 3.5 Co-Enzyme 4. Vitamins and Minerals 4.1 Types and Sources 4.2 Biological importance 4.3 Deficiencies and Disorders Key words/Tags : Biomolecules, Buffer system, Enzymes, Vitamins,	12

II	Metabolism, Physiology and Regulation **1. Protein** 1.1 Structure, Nomenclature, Classification and Biological importance. 1.2 Metabolism -Deamination, Decarboxylation, Transamination of amino acids and Ornithine cycle **2. Carbohydrates** 2.1 Structure, Nomenclature, Classification and Biological importance. 2.2 Metabolism -Glycogenesis, Gluconeogenesis, Glycogenolysis, Glycolysis, Citric Acid Cycle and Electron Transport Chain **3. Lipids** 3.1 Structure, Classification and Biological importance 3.2 Metabolism -Beta oxidation of fatty acids. **4. Physiology of Digestion,** regulation and disorders **5. Homeostasis and Basal Metabolic rate** (BMR) **6. Thermoregulation** Key words/Tags :Proteins, Carbohydrates, Krebs cycle, Digestion,,Homeotherms	14
III	Respiration, Excretion and Immune System **1. Respiration** 1.1 Mechanism -Inspiration and Expiration 1.2 Physiology- Exchange and Transport of Gases (Oxygen and carbon dioxide), Chloride shift, role of Respiratory pigment. 1.3 Disorders - Apnea, Hypoxia, Asphyxia, Carbon monoxide poisoning, Bronchitis, Asthma **2. Excretion** 2.1 Physiology -Urea, Urine formation and Counter Current mechanism 2.2 Excretory products, disorders 2.3 Osmoregulation **3. Immunity** 3.1 Innate and acquired Immunity 3.2 Immune cells and Immuno Gobulinus 3.3 Antigen responses Key words/Tags: Chloride shift, Excretion, Urea, Immunity, Antigen	12
	Co-ordination	

Practical Syllabus

Part A Introduction				
Program : Diploma		Class:B.Sc. B.Sc.	Year: II Year	Session: 2022 - 23
Subject: Zoology				
1	Course Code	S2-ZOOL2P		
2	Course Title	System Physiology and Biochemistry, paper - II		
3	Course Type (Core Course/Elective/Generic Elective/Vocational.....)	Core course		
4	Pre-requisite (if any)	To study this course, a student must have had the Subject Zoology in class B.Sc. I year /certificate.		
5	Course Learning outcomes (CLO)	Upon completion of this course , students will be able to understand – 1 The effect of temperature and pH on enzyme activity. 2 Qualitative estimation of bimolecules and gain knowledge of their role in our body. 3 Various parameters of hematology and know importance of it for our healthy life. 4 The principle and working of instruments required for performing exercises in laboratory. 5 Collaborative learning and communication skills through practical sessions in laboratory. 6 Assignment and project writing process which will give them a flow o 7 f research and writing skills.		
6	Credit Value	2		
7	Total Marks	Max. Marks: 30+70		Min. Passing Marks : 33

Part B – Content of the Course		
Total No. of Lectures-Tutorials-Practical : (2 Hours per Week) L-T-P : No. of Lectures= 30		
Unit	Topics	No. of Lectures
I	1. Qualitative estimations of Protein, Carbohydrates and Lipids. 2. Study of effect of temperature and pH on salivary amylase activity. 3. Study of enzymatic activity of Trypsin and Lipase. 4. Detection of ammonia, urea and uric acid	7
II	5. Estimation of hemoglobin using haemometer. 6. Preparation of haemin crystals. 7. Preparation of blood smear, study and identification of blood cells. 8. Determination of ABO blood groups. RBC, WBC counting	12