Shri Jagdishprasad Jhabarmal Tibrewala University

(Common to all Branches)

Detailed Syllabus of Diploma First Year

SHRI JAGDISHPRASAD JHABARMAL TIBREWALA UNIVERSITY
श्री जगदीशप्रसाद झाबरमल टीबडेवाला विश्वविद्यालय

INSTITUTE OF ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

Teaching & Scheme of Examination for Diploma (Common to All Branch)

EFFECTIVE FROM ACADEMIC SESSION 2013-2016

Year: I **Semester: I**

S. No.	Subject Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
Theory									
1	DP-101	English & Communication Skills-I	3	1	-	3	30/12	70/28	100/40
2	DP-102	Applied Physics-I	3	1	-	3	30/12	70/28	100/40
3	DP-103	Applied Chemistry-I	3	1	-	3	30/12	70/28	100/40
4	DP-104	Applied Mathematics-I	3	1	-	3	30/12	70/28	100/40
5	DP-105	Computer & Information Technology Fundamentals-I	3	1	-	3	30/12	70/28	100/40
6	DP-106	Applied Mechanics-I	3	1	-	3	30/12	70/28	100/40
Practical's									
7	DP-107	Workshop Practice	-	-	3	3	40/16	60/24	100/40
8	DP-108	English & Communication Skills Lab	-	-	3	3	40/16	60/24	100/40
9	DP-109	Electrical & Electronics Lab	-	-	3	3	40/16	60/24	100/40
10	DP-110	Physics Lab	-	-	3	3	40/16	60/24	100/40
		Total	**18**	**6**	**12**				**1000**
		Total Teaching Load	**36**						

DP-101 ENGLISH & COMMUNICATION SKILLS-I

The students seeking admission to the diploma courses do not have the required proficiency in English. It has, therefore, been decided to introduce English and Communication Techniques to help them to attain proficiency in the subject.

1. Narration, Voice, Basic Sentence Patterns. (Nine basic sentence patterns)
2. Transformation of Sentences, Determiners, Preposition.
3. Tenses, Common errors (Noun, Pronoun, Articles, Adverb, Punctuation, Preposition etc.)
4. Modals in Conversational Usage, Prefix, Suffix,

Idioms & Phrasal verbs :

Modals

Can, Could, Should ,Will, Would, May, Might, Must, Need not, Dare not, Ought to, Used to.

DP-102 APPLIED PHYSICS-I

1. Units and Dimensions:

1.1 Idea of various systems of units
SI units - Basic, Supplementary and Derived Units,
Prefixes & Symbols
1.2 Dimensions and Dimensional Formulae
1.3 Principle of Homogeneity of Dimensions
1.4 Dimensional Analysis
1.5 Applications and Limitations

2. Elasticity:

2.1 Elasticity
2.2 Stress and Strain
2.3 Elastic Limit & Hooke's law
2.4 Young's Modulus, Bulk Modules & Modulus of Rigidity,
Poisson's Ratio

3. Properties of Liquids:

3.1 Surface Tension & Surface Energy
3.2 Cohesive & Adhesive Force
3.3 Angle of Contact
3.4 Capillarity & Expression for Surface Tension
3.5 Streamline & Turbulent Flow
3.6 Reynold Number.
3.7 Viscosity & Coefficient of Viscosity
3.8 Stoke's law & Terminal Velocity

4. Gravitation & Satellites:

4.1 Newton's law of Gravitation
4.2 Acceleration due to Gravity
4.3 Kepler's laws of Planetary Motion (statement only)
4.4 Artificial Satellite (simple idea), Geo-Stationary Satellites
4.5 Escape Velocity
4.6 Velocity & Time Period of an Artificial Satellite.

5. Sound Waves:

5.1 Velocity of Sound Waves
5.1.1 Newton's Formula
5.1.2 Laplace Correction
5.1.3 Factors affecting Velocity of Sound Waves
5.2 Propagation of Progressive Wave, Displacement, Velocity and

Acceleration of a particle during propagation of wave

5.3 Superposition of Waves

5.3.1 Stationary Waves (without mathematical analysis)

5.3.2 Resonance tube

6. Transfer of Heat:

6.1 Modes of Transmission of Heat - Idea of Conduction,
Convection & Radiation

6.2 Thermal Conductivity & Coefficient of Thermal Conductivity

6.3 Black Body

6.4 Kirchoff's Laws & Stefan Boltzmann Law (statement only)

6.5 Newton's Law of Cooling & its Derivation from Stefan's Law

DP-103 APPLIED CHEMISTRY-I

1. Atomic Structure:

1.1 Constituents of the Atom

1.2 Bohr's Model of the Atom

1.3 Quantum Number and Electronic Energy Levels

1.4 Aufbau's Principle, Pauli's Exclusion Principle, Hund's Rule, $n + l$ Rule

1.5 Electronic Configuration of Elements (s,p,d Block Elements)

2. Development of Periodic Table:

2.1 Modern Periodic Law, Long form of Periodic Table.

2.2 Study of Periodicity in Physical and Chemical Properties with special reference to : - Atomic and Ionic Radii, Ionisation Potential. Electron Affinity. Electronegativity. Variation ofEffective Nuclear Charge in a Period. Metallic Character.

3. Electro Chemistry:

3.1 Ionisation, Degree of Ionisation, Factors which Influence Degree of Ionisation .

3.2 Hydrolysis – Degree of Hydrolysis, Hydrolysis Constant.

3.3 pH Value

3.4 Buffer Solution

3.5 Electrolysis, Faraday's Laws of Electrolysis

4. Kinetic Theory of Gases:

4.1 Postulates of kinetic Theory

4.2 Ideal Gas Equation, Pressure and Volume Corrections, Vender Walls Equations

4.3 Liquefaction of Gases, Critical Pressure and Critical Temperature for Liquefaction.

4.4 Liquefaction of Gases by Joule – Thomson Effect, Claude's Method and Linde's Method

5. Carbon Chemistry:

5.1 Definition of Organic Chemistry. Difference between Organic and Inorganic Compounds.

5.2 Classification and Nomenclature - Open Chain and Closed Chain Compounds, IUPAC System of Nomenclature. (upto C5).

6. Metals and Alloys:

6.1 General Principles and Terms listed in Metallurgy

6.2 Metallurgy of Iron and Steel

6.3 Different forms of Iron

6.4 Effect of Impurities on Iron and Steel

6.5 Effect of Alloying Elements in Steel

7. Pollution:

7.1 Water Pollution

7.1.1 Causes and Effects

7.1.2 Treatment of Industrial Water Discharges -Screening, Skimming and Sedimentation Tanks, Coagulation, Reductions, Chlorination, Biological Methods.

7.2 Air Pollution

7.2.1 Causes and Effects

7.2.2 Control Methods – Electrostatic Precipitator, Scrubbers, Gravitational Setting Methods, by Plants.

7.3 Awareness on Green House Effect, Depletion of Ozone Layer and Acid rain.

DP-104 APPLIED MATHEMATICS-I

1. 1.1 **Introduction to Different Types of Expansion:**

1.1.1 Factorial Notation

1.1.2 Meaning of C (n, r), P (n, r)

1.1.3 Binomial Theorem for Positive Index, any Index

1.1.4 Exponential Theorem

1.1.5 Logarithm Theorem

1.2 **Complex number:**

1.2.1 Definition of Complex Number

1.2.2 Operations on Complex Number (Add., Sub., Multiplication, Division)

1.2.3 Conjugate Complex Number

1.2.4 Modulus and Amplitude of a Complex Number

1.2.5 Polar form of a Complex Number

2. Trigonometry:

2.1 Allied Angle (sin (180±A), sin (90±A) etc.,

2.2 Sum and Difference Formula (without proof) and their Application

2.3 Product Formula and C-D Formula

2.4 T-Ratios of Multiple and Sub-Multiple Angles (2A, 3A, A/2)

2.5 Solution of Trigonometric Equations: sin X = 0, tan X = 0, cos X = 0, sin X=A, cos X =A & tan x = A

3. Matrices and Determinants:

3.1 Definition and Properties of Determinants

3.2 Definition and Types of Matrix

3.3 Transpose of a Matrix, Symmetric, Skew Symmetric Matrices, Orthogonal matrices, Hermitian and Skew Hermitian

3.4 Minors and Cofactors

3.5 Adjoint and Inverse of a Matrix

3.6 Cramer's Rule

3.7 Solution of Simultaneous Linear Equations by Inverse Matrix Method.

3.8 Characteristic Matrix, Characteristic Equation, Eigen Values & Vectors, Cayley Hamilton Theorem (verification only)

4. Numerical Integration :

4.1 Trapezoidal Rule

4.2 Simpson's 1/3 Rule

4.3 Simpson's 3/8 Rule

4.4 Newton - Raphson Rule

5. Two Dimensional Coordinate Geometry:

5.1 General Introduction

5.2 Distance Formula and Ratio Formula

5.3 Co-ordinate of Centroid, In-Centre, Ortho-Centre and Ex-Centre of a Triangle

5.4 Area of Triangle

5.5 Straight Line, Slope form, Intercept form, Perpendicular form, One Point Slope form, Two Point form & General form

5.6 Angle between Two Lines

5.7 Perpendicular Distance of a Line from a Point

6. Conic:

6.1 **Circle :**

6.1.1 Definition and Standard Equations

6.1.2 Equations of Tangent and Normal at a Point (simple problems)

6.2 **Parabola :**

6.2.1 Definition and Standard Equations

6.2.2 Equations of Tangent and Normal at a Point (Simple problems)

6.3 **Ellipse and Hyperbola :**

6.3.1 Definition and Standard Equations

6.3.2 Equations of Tangent and Normal at a Point(simple problems)

DP-105 COMPUTER & INFORMATION TECHNOLOGY FUNDAMENTALS-I

1. Introduction:

1.1 Computer: An Introduction

1.2 Generation of Computers & Types : PC, PC/XT, PC/AT, Main Frame, Super, Lap Top, Pam Top

1.3 Data Representation

1.3.1 Bit, Nibble, Byte, Word

1.3.2 Number System : Decimal, Binary, Hexadecimal & their Conversions

1.3.3 Arithmetic Operations (Addition, Subtraction using Binary Number System

1.3.4 1s , 2s Compliment

1.3.5 Coding Technique : BCD, EBCDIC, ASCII

1.4. Idea of:

1.4.1 Hardware

1.4.2 Software

1.4.3 Firmware

1.4.4 Free ware

1.4.5 Human ware

1.5 Computer Languages and Translators:

1.5.1 Machine

1.5.2 Assembly

1.5.3 High Level Language

1.5.4 Scripting Language

1.5.5 Object Oriented Language

1.5.6 Platform Independent Language

1.5.7 Translators: Assembler, Interpreter, Compiler

2. Introduction to Computer:

2.1 Central Processing Unit (CPU)

2.2 Memory Unit

2.3 Input/ Out Devices : Keyboard, Mouse (Optical), Digitizer, Scanner, Web Camera, Monitor (CRT, TFT) Printers, Plotters, Bar Code Reader

2.4 Secondary Storage Devices : Floppy, Hard Disk, CD, DVD, Flash Drive

2.5 Block Diagram Showing Interconnection of Computer Parts

3. Operating System :

3.1 Definition of Operating System (OS)

3.2 Types of OS

3.2.1 Single user

3.2.2 Multi user

3.2.3 Multi Programming

3.2.4 Time Sharing

3.2.5 Multi Processing,

4. Introduction to Windows XP:

4.1 Introduction to Windows Environment

4.2 Parts of Windows Screen

4.3 Icon, Menu, Start Menu

4.4 Minimizing, Maximizing, Closing Windows

4.5 Windows Explorer, Recycle Bin, Clipboard, My Computer, My Network Places

4.6 Control Panel: Adding New Hardware and Software, Display, Font, Multimedia, Mouse, International System

4.7 Accessories: Paint, Media Player, Scan disk, System Information

5. Information Concepts and Processing:

5.1 Definition of Data, Information

5.2 Need of Information

5.3 Quality of Information

5.4 Concepts of Data Security, Privacy, Protection
5.5 Computer Virus and their types
5.6 Scanning & Removing Virus

DP-106 APPLIED MECHANICS-I

1. Force:

Definition
Units
Different Types of Forces.

2. Coplanar Forces:

Resolution of Forces
Law of Parallelogram of Forces
Resultant of two or more Forces
Basic Conditions of Equilibrium
Lami's Theorem (No Proof)
Jib Crane

2 .7 Law of Polygon of Forces (Only Statement)

3. Moment:

3.1 Definition, Units & Sign Convention
3.2 Principle of Moments
Application of Equilibrium Conditions for non-concurrent Forces

Application of Principles of Forces & Moments:

4.1 Levers & their Types.
4.2 Reactions of Simply Supported Beams (Graphical & Analytical Method)
4.3 Steel Yard.
4.4 Lever Safety Valve
4.5 Foundry Crane

5. Centre of Gravity:

5.1 Concept
5.2 Centroid
5.3 Calculation of C.G. of Regular Bodies
5.4 Calculation of C.G. of Plain Geometrical Figures

6. Friction:

6.1 Types of Friction
6.2 Laws of Friction
6.3 Angle of Friction
6.4 Angle of Repose
6.5 Friction on Horizontal and Inclined Plains
6.6 Application of Laws of Friction Related to Wedge, Ladder and Screw Jack.

7. Simple Machines:

7.1 Basic Concepts
7.2 Loss in Friction
7.3 Inclined Plane
7.4 Simple & Differential Wheel and Axle (Neglecting Rope thickness)
7.5 Screw Jack
7.6 Lifting Crabs, 7.7 Systems of Pulleys
7.8 Worm and Worm Wheel

PRACTICAL AND SESSIONALS

DP-107 WORKSHOP PRACTICE

1. A group of student shall be required to do practicals in all the shops during the year. The practical examination will be taken in the shops covered during year.

2. Theory parts of syllabus should be dealt with the respective practicals in practicals classes.

3. Students have to prepare a practical notebook showing the names, specifications and uses of tools and equipment for each shop with figures. This notebook shall be submitted at the time of the Board's practical examinations (PR).

1. Carpentry Shop :

Theory ::

Knowledge of Common Indian Timbers. Name, Functions, Material and Specifications of Common Hand Tools, Holding Tools, Cutting Tools, Measuring and Marking Tools used in Carpentry, Safety Measures.

Introduction of Carpentry Joints and their relative Advantages and uses.

Elementary Idea about the Wooden Polishing Work.

Introduction to Various Carpentry Machine (Band Saw, Circular Saw, Wood Turning Lathe, Wood Planner)

Exercise:

1. Preparation of Cross-Half Lap Joint.
2. Preparation of Dovetail Joint
3. Preparation of Bridle Joint
4. Preparation of Mortise and Tenon Joint
5. Preparation of Mitre Joint
6. Demonstration of Job on Wooden Polishing Work.

2. Welding and Sheet Metal Shop:

2.1 Welding Shop:

Theory :

Introduction to Welding and its Importance in Engineering Practices, Common Materials that can be Welded.

Gas Welding Theory : Gas Welding Equipment Adjustment of different types of Flames, Practice in Handling Gas Welding Equipment .

Electric arc Welding Theory (AC and DC), Safety Precautions while using Electric arc Welding. Practice in Setting Current and Voltage for Striking Proper arc.

Common Welding Defects and Inspection, various type of Joints, end Edge Preparation.

Explain Soldering, Brazing and Tipping of Tools, Gas Cutting

Exercise:

1. Preparation of a Butt Joint by Gas Welding.
2. Preparation of Lap Joint by Electric arc Welding.
3. Preparation of T-Joint by Electric arc Welding.
4. Demonstration on Brazing by the Instructor.
5. Demonstration on Soldering.
6. Demonstration on Gas Cutting.

2.2 Sheet Metal Shop:

Theory :

Name, Functions and Specification of Common Sheet Metal Tools Like

Slakes, Hammers, Hand Snips, Hand Punches, Groovers, Rivet Sets, Chisels

Name and Function of Marking and Measuring Tools - Scale, Circumference Rule, Straight Edge, Scriber, Semi Circular Protector, Trammel.

Preliminary Idea of Simple Sheet Metal Operations, Different Types of Sheet Metal Edges and Joints, Riveting Methods. Development of Surface in Sheet Metal Work

3. Fitting and Plumbing Shop:

3.1 Fitting shop:

Theory :

Introduction to different materials used in Fitting Shop. Description of Work Bench, Names, Functions and Specification of Holding Devices.

Specification of Files, Precautions While Filing.

Marking of Jobs, use of Marking and Measuring Tools.

What is Chipping, Where Chipping is done. Names Functions and Specifications of Chisels, Hammers etc.

Simple Operation of Hack sawing,

Exercise:

Preparation of following utility Jobs Involving Various Sheet Metal Joints (Single and Double Hem Joints, Wired Edge, Lap Joint, Grooved Seam Joint, Single and Double Seam Joint) and Exercises (Soldering and Riveting Joints)

1. Preparation of a Soap Tray & Mug
2. Preparation of Funnel.

Exercise:

1. Marking Filing & Hack Sawing Practice.
2. Production of Utility Job involving Marking, Filling and Hack Sawing.
3. Production of Utility Job involving Marking, Filling and Hack Sawing Drilling and Tapping.

different types of Blades, and their uses, Fitting of Blade in Hacksaw Frame.

Name, Functions and Specifications of Drills, Selection of Drills for Tapping, Types of Tapes, Tapping and Dieing Operations.

Precaution While Drilling Soft Metals, Specially Lead.

3.2 Plumbing shop:

Theory :

Classification of Pipes According to Materials and use I.S.I. Specification for Pipes. Introductions to Cement and PVC Pipes and their uses.

Names Functions and Specifications of Plumbing Tools and Accessories such

as Pipe Dies, Wrenches, and
Pipe Vices. Different Pipe Fittings

Exercise:

1. Cutting and Threading on G.I. Pipe
2. Exercise on PVC Pipe Fitting.
3. Repair of Taps and Cocks.

DP-108 ENGLISH & COMMUNICATION SKILLS LAB

1. Listening:

1.1 For improving listening skills the following steps are recommended,
1.1.1 Listen to Prerecorded Tapes
1.1.2 Reproduce Vocally what has been heard
1.1.3 Reproduce in Written form
1.1.4 Summarize the text heard
1.1.5 Suggest Substitution of Words and Sentences
1.1.6 Answer Questions related to the taped text
1.1.7 Summarize in Writing

2. Speaking:

2.1 Introducing English consonant-sounds and vowel-sounds.
2.1.1 Remedial exercises where necessary
2.2 Knowing Word stress Shifting word stress in poly-syllabic words
[For pronunciation practice read aloud a para or page regularly while others monitor]

3. Vocabulary:

3.1 Synonyms. Homonyms. Antonyms and Homophones
3.2 Words often confused, as for example,
[I-me; your-yours; its-it's; comprehensible-comprehensive; complement-compliment]
3.3 Context-based meanings of the words, for example,
3.3.1 man[N] man[vb]; step[|N| ,step[vb]
3.3.2 conflict _____Israel Palestinian conflict Emotional conflict, Ideas conflict
3.3.3 learn ——— 1 learn at this school I learnt from the morning news

4. Delivering Short Discourses:

4.1. About oneself
4.2 Describing a Place, Person, Object
4.3 Describing a Picture, Photo.

5. Group Discussion :

5.1 Developing skill to initiate a discussion [How to open]
5.2 Snatching initiative from others [Watch for weak points, etc.]

6. Expand a topic-sentence into 4-5 sentence narrative.

DP-109 ELECTRICAL & ELECTRONICS LAB

1. Study of Symbol, Specification and Approximate Cost of Common Electrical Accessories, Tools and Wires & Cables Required for Domestic Installation.
2. Study of :
    2.1 Basic Electricity Rules for a Domestic Consumer
    2.2 Safety Precautions & use of Fire Fighting Equipments
3. Use of series of Phase Tester, Series Test Lamp, Tong Tester and **3**
Megger in Testing of Electrical Installation.
4. 4.1 Prepare a Potential Divider and Measure Resistance of a Filament Lamp Using Voltmeter and Ammeter.
    4.2 Measurement of Power and Energy Consumption by an Electric Heater using Watt Meter and Energy Meter.
5. Preparation of Wiring Diagram, Wiring, Testing, Fault Finding & Costing for :
    5.1 Control of one Lamp by one Switch (using Batten andTumbler Switch)
    5.2 Control of Stair Case Wiring (using Casing Capping,CFL and Flush Type Switches)
    5.3 Control of one Bell Buzzer and Indicator by one Switch(using Conduit and Flush type Switch)
6. Prepare one Switch Board as per Institutional Requirement (using Flush type Switches, Sockets, MCB, ELCB, Etc.)
7. Study, Connecting, Testing and Fault Finding of
    7.1 Fluorescent Tube and its Accessories
    7.2 Ceiling Fan with resistance type and Electronic Regulator
8. Study, Functioning, Fault Finding & Repairing of following Domestic Appliances -
8.1 Automatic Electric Iron
8.2 Air Cooler
8.3 Electric Water Pump
9. Design, Draw and Estimate the Material required for Installation for a small Residential Building/ Office/ Hall.

DP-110 PHYSICS LAB

1. To Measure Internal Dia, External Dia and Depth of a Calorimeter using Vernier Callipers.
2. To Measure Density of a Wire using Screwgauge
3. To Measure Radius of Curvature of a Lens, Mirror using Spherometer.
4. To Determine Refractive Index of Glass using Prism.
5. To Determine the Refractive Index of Glass using Travelling Microscope
6. To Determine Focal Length of a Convex Lens by Displacement Method.
7. To Determine the Velocity of Sound at O0c using Resonance Tube.
8. To Determine Young's Modulus of Elasticity using Searle's Apparatus.
9. To Determine Acceleration due to Gravity using Simple Pendulum.
10. To Verify Newton's Law of Cooling.

11. To Verify Law of Resistances.
12. To Determine Specific Resistance of Material using Meter Bridge.
13. To Determine Internal Resistance of a Primary Cell using Potentiometer.
14. To Compare emf of two Primary Cells using a Potentiometer.
15. To Draw Characteristic Curves of PN Diode and Determine its Static and Dynamic Resistance.
16. To Draw Characteristic Curves of a PNP/NPN Transistor in CB/CE Configuration.
17. To Measure Resistance of a Galvanometer by Half-Deflection Method.

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INSTITUTE OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING
Teaching & Scheme of Examination for Diploma (Common to All Branch)
EFFECTIVE FROM ACADEMIC SESSION 2013-2016

Year: I **Semester: II**

S. No.	Subject Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
Theory									
1	DP-201	English & Communication Skills-II	3	1	-	3	30/12	70/28	100/40
2	DP-202	Applied Physics-II	3	1	-	3	30/12	70/28	100/40
3	DP-203	Applied Chemistry-II	3	1	-	3	30/12	70/28	100/40
4	DP-204	Applied Mathematics-II	3	1	-	3	30/12	70/28	100/40
5	DP-205	Computer & Information Technology Fundamentals-II	3	1	-	3	30/12	70/28	100/40
6	DP-206	Applied Mechanics-II	3	1	-	3	30/12	70/28	100/40
Practical's									
7	DP-207	Engineering Drawing	-	-	3	3	40/16	60/24	100/40
8	DP-208	Computer Lab	-	-	3	3	40/16	60/24	100/40
9	DP-209	Mechanics Lab	-	-	3	3	40/16	60/24	100/40
10	DP-210	Chemistry Lab	-	-	3	3	40/16	60/24	100/40
Total			**18**	**6**	**12**				**1000**
Total Teaching Load			**36**						

DP-201ENGLISH & COMMUNICATION SKILLS-II

Phrases

At all; In stead of; In Spite of; As well as; Set up; Up set; Look up; Call off; Call out; Come across; Set right; Look other.

Idioms

Work up (excite); Break down; Stand up for; Turn down; Pass away; Pass on; Back up; Back out; Carry out; Done for (ruined); Bring about; Go through; Ran over; Look up (improve); Pick out (selected).

5. Composition - 1. Unseen Passage, Precise Writing
6. Letter Writing, Paragraph Writing, Report Writing
7. Essay Writing - Essays on general and local topics related to environmental problems.

DP-202 APPLIED PHYSICS-II

Electrostatics:

1.1 Coulomb's Law
1.2 Intensity of Electric Field, Intensity due to a Point Charge
1.3 Electric Lines of Forces & Electric Flux
1.4 Electric Potential, Electric Potential due to a Point Charge

2. D.C. Circuits :

2.1 Resistivity, Effect of Temperature on Resistance
2.2 Ohm's Law
2.3 Resistance in Series and Parallel and their Combination
2.4 Kirchoff's Law
2.5 Wheatstone Bridge
2.6 Meter Bridge
2.7 Principle of Potentiometer

3. A.C. Circuits:

3.1 Faraday's Laws of Electro Magnetic Induction, Lenz's Law
3.2 Self and Mutual Inductance
3.3 Alternating Current, Phase & Phase Difference
3.4 Instantaneous, Average and rms value of AC
3.5 Behaviour of Resistance, Capacitance and Inductance in an AC Circuit
3.6 AC Circuits Containing, R-L, R-C and LCR in Series
3.7 Power in AC Circuit and Power Factor
3.8 Choke Coil

4. Semi Conductor Physics:

4.1 Energy Bands in Conductor, Semi Conductor & Insulator
4.2 Chemical Bonds in Semiconductor
4.3 Intrinsic and Extrinsic Semiconductors
4.4 PN-Junction Diode, Working, Biasing and Characteristics Curves

4.5 Zener Diode and Voltage Regulation using it
4.6 Half Wave & Full Wave Rectifiers (only working, no derivations)
4.7 Junction Transistors, Working, Biasing and Characteristic Curves
4.8 Brief Idea of Using Transistors as an Amplifier (without mathematical analysis)

5. Modern Physics:
5.1 Photo Electric Effect
5.2 Einstein's Equation
5.3 Photo Cells
5.4 Lasers
5.4.1 Stimulated Emission and Population Inversion
5.4.2 Types of Laser - Helium Neon and Ruby Laser
5.4.3 Application of Lasers (brief idea only)
5.4.3.1 Material Processing
5.4.3.2 Lasers in Communication
5.4.3.3 Medical Applications.

6. Nuclear Physics:
6.1 Idea of Nuclear Force
6.2 Mass - Defect and Binding Energy
6.3 Nuclear Reactions,
6.4 Natural and Artificial Radioactivity
6.5 Law of Radioactive Disintegration
6.6 Half Life & Mean Life
6.7 Idea of Nuclear Fission and Fusion
6.8 Chain Reaction
6.9 Nuclear Reactor

7. Pollution and its control: 5
7.1 Introduction to Pollution – Water, Air, Soil , Noise, Nuclear and mental pollution
7.2 Types of Pollution
7.3 Brief idea about Noise Pollution and its Control
7.4 Nuclear Hazards
7.5 Nuclear Waste Management

DP-203 APPLIED CHEMISTRY-II

1. Water:
1.1 Sources of Water
1.2 Hardness of Water.
1.3 Degree of Hardness, Estimation of Hardness by EDTA method, Problems on Calculation of Hardness
1.4 Disadvantages of Hardness
1.5 Softening Methods

1.5.1 Lime-Soda Method
1.5.2 Permutite Method
1.5.3 Ion -Exchange Method
1.6 Problems on Softening of Water
1.7 Drinking Water, its Requisites, Purification and Sterilization of Water.

2. Fuels:
2.1 Definition, Classification
2.2 Calorific Value (HCV and LCV) and Numerical Problems on
Calorific Value
2.3 Combustion of Fuels, Numerical Problems on Combustion
2.4 Solid Fuels
2.4.1 Coal and Coke
2.5 Liquid Fuels
    2.5.1 Petroleum and its Distillation
    2.5.2 Cracking, Octane and Cetane Values of Liquid Fuels
    2.5.3 Synthetic Petrol, Power Alcohol
2.6 Bio-Gas
2.7 Nuclear Fuels – Introduction to Fission and Fusion Reactions.

3. Corrosion:
3.1 Definition
3.2 Theories ff Corrosion
    3.2.1 Acid Theory (Rusting)
    3.2.2 Direct Chemical Corrosion or Dry Corrosion
    3.2.3 Wet Corrosion or Electro-Chemical Corrosion (Galvanic and Concentration Cell Corrosion)
3.3 Various Methods for Protection from Corrosion

4. Polymers:
4.1 Definition
4.2 Plastics
4.2.1 Classification, Constituents
4.2.2 Preparation, Properties and Uses of Polythene, Bakelite Ethylene and Nylon.
4.3 Rubber
4.3.1 Natural Rubber, Vulcanization
4.3.2 Synthetic Rubbers - Buna - N, Buna-S, Butyl and Neoprene

5 Cement and Glass:
5.1 Manufacturing of Portland Cement
5.2 Chemistry of Setting and Hardening of Cement
5.3 Glass : Preparation, Varieties and Uses.

6. Lubricants:

6.1 Definition, Classification

6.2 Properties of Lubricants : Viscosity, Oiliness, Flash Point, Fire Point, Acid Value, Saponification, Emulsification, Cloud and Pour Point.

6.3 Artificial Lubricants

7 Miscellaneous Materials:

7.1 Refractories : Definition, Classification and Properties

7.2 Abrasives : Natural and Synthetic Abrasives

7.3 Paint and Varnish : Definition and Function of Constituents

7.4 Soap and Detergents : Definition, Properties and Uses

8. New Engineering Materials: (Brief Idea of Following)

8.1 Superconductors

8.2 Organic Electronic Materials

8.3 Fullerences

8.4 Optical Fibres

DP-204 APPLIED MATHEMATICS-II

1. Function:

1.1 Definition of Function

1.2 Range and Domain of Function

1.3 Types of Function

1.3.1 Absolute Value Function

1.3.2 Exponential value Function

1.3.3 Identity Function

1.3.4 Reciprocal Function

1.3.5 Rational and Irrational Function

1.3.6 Increasing and decreasing Function

1.4 Limits

1.4.1 Concept of Limit

1.4.2 L.H.L., R.H.L.

1.4.3 Limit of Standard Functions

$$\lim_{x\to 0}\frac{\sin x}{x},\quad \lim_{x\to 0}\frac{\cos x}{x},\quad \lim_{x\to 0}\frac{\tan x}{x}$$

$$\lim_{x\to a}\frac{x^n-a^n}{x-a},\quad \lim_{x\to 0}\frac{e^x-1}{x},\quad \lim_{x\to 0}\frac{a^x-1}{x}$$

$$\lim_{x\to 0}\frac{\log(1+x)}{x}$$ (simple problems)

1.5 Concept of Continuity and Differentiability at a Point (simple Problems).

2. Differential Calculus :

2.1 Standard Formulae (Except Hyperbolic Function)

2.1.1 Derivative of Sum, difference, Multiplication and Division of two Functions

2.1.2 Differentiation of Function of a Function

2.1.3 Logarithmic Differentiation

2.1.4 Differentiation of Implicit Functions

2.1.5 Differentiation of Parametric Functions

2.1.6 Differentiation by Trigonometric Transformations

2.1.7 Differentiation of a Function w.r.t. Another Function

2.2 Second Order Derivative

3. Applications of Differential Calculus:

3.1 Geometrical meaning of dy / dx . Tangents and Normals

3.2 Angle of Intersection between two Curves

3.3 Derivative as a Rate Measurer

3.4 Errors and Approximations

3.5 Maxima and Minima of Function with one Variable

4. Integral Calculus:

4.1 General Introduction of Integral Calculus

4.2 Integration of Sum and difference of Functions.

4.3 Integration by Simplification

4.4 Integration by Substitution

4.5 Integration by Parts

4.6 Integration of Rational and Irrational Functions

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{a^2 - x^2}, \int \frac{dx}{x\sqrt{x^2 - a^2}}, \int \frac{dx}{x\sqrt{x^2 \pm a^2}}, \int \frac{dx}{x\sqrt{a^2 - x^2}},$$

$$\int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}, \int \sqrt{a^2 - x^2}\,.dx, \int \sqrt{x^2 - a^2}\,.dx$$

Additional standard formulae

$$\int e^{ax} \sin bx dx, \int e^{ax} \cos bx.dx$$

4.7 Integration of Trigonometric Functions

$$\int \sin^m x \cos^n x dx, \int \frac{dx}{a + b\sin x}, \int \frac{dx}{a + b\cos x}, \int \frac{dx}{a + b\sin^2 x},$$

$$\int \frac{dx}{a + b\cos^2 x}, \int \frac{dx}{a\cos^2 x + b\sin^2 x}$$

4.8 Definite Integral and its Properties

DP-205 COMPUTER & INFORMATION TECHNOLOGY FUNDAMENTALS-II

1. Computer and Communication:

1.1 Need of Data Transmission

1.2 Data Transmission Media

1.3 Baud rate and Bandwidth, Digital and Analog Transmission
Serial and Parallel Data Transfer, Protocols, MODEM.
1.4 Networking of Computers : LAN, WAN, MAN, Blue tooth
1.5 LAN Topologies: Bus, Star, Ring, Hybrid
1.6 Introduction to Ports : RS232, IEEE 488, PS2, USB, UTP

2. Internet:

2.1 Introduction to Internet
2.2 Bridges, Routers, Switch, Gate way
2.3 www, Web Site, URL
2.4 e-mail, e-Commerce
2.5 Web browsing, Web page
2.6 Introduction to Hyper text & HTML
2.7 Introduction to http & ftp Protocol

3. Information Processing:

3.1. Word processor
- 3.1.1 Introduction to MS-Word
- 3.1.2 Starting MS-Word
- 3.1.3 Special Features of MS-Word
- 3.1.4 Using Help
- 3.1.5 Opening Document, Typing and Editing
- 3.1.6 Copying, Inserting, Moving, Deleting
- 3.1.7 Copying from One Document to Others .
- 3.1.8 Undo, Redo, Spell Check, Find and Replace
- 3.1.9 Formatting
- 3.1.9.1 Characters and Fonts
- 3.1.9.2 Spacing
- 3.1.9.3 Removing Characters Formatting
- 3.1.10 Inserting Symbols
- 3.1.11 Paragraphs.
- 3.1.12 Page Setting
- 3.1.13 Header and Footer
- 3.1.14 Page Breaks
- 3.1.15 Borders and Shading
- 3.1.16 Print Preview and Printing
- 3.1.17 Tables and Columns
- 3.1.18 Mail Merge
- 3.1.19 Auto Text and Auto correct
- 3.1.20 Introduction to Macro

3.2 Electronic Spread Sheet
- 3.2.1 Introduction to MS-Excel
- 3.2.2 Working with Spread Sheet

3.2.3 Editing the Worksheet
3.2.4 Worksheet Formatting
3.2.5 Formula Entering
3.2.6 Function Wizard
3.2.7 Saving and Printing Work Book
3.2.8 Analysis Tools
3.2.9 Data Tools
3.2.10 Charts
3.2.11 Linking Work Sheets
3.2.12 Report Wizard
3.2.13 Data Base Application
    3.2.13.1 Data Base Components
    3.2.13.2 Working with Database
    3.2.13.3 Creating Excel Database
    3.2.13.4 Adding Records using Data Form
    3.2.13.5 Deleting Records using Menu Command
3.2.13.6 Deleting Records using Data Form
3.2.13.7 Editing Records
3.2.13.8 Finding Records based on Criteria

4. Power Point:

4.1 Introduction to Power Point
4.2 Creating a Presentation/Slide
4.3 Adding Animation in Slide
4.4 Running a Slide Show

DP-206 APPLIED MECHANICS-II

1. Rectilinear Motion:

1.1 Concept
1.2 Motion under Constant Velocity
1.3 Motion under Constant Acceleration
1.4 Velocity-time graph and its uses

2. Motion under Gravity:

2.1 Concept
2.2 Vertical Motion
2.3 Smooth Inclined Plane

3. Projectiles:

3.1 Concept
3.2 Range, Maximum Height and Time of Flight
3.3 Equation of Trajectory
3.4 Calculation of Velocity of Projectile at Certain Height And at Certain instant

4. Newton's Laws of Motion:

4.1 Definitions

4.2 Momentum and it's Unit

4.3 Application of Second Law of Motion

5. Impact and Collision:

5.1 Concept

5.2 Impulse and Impulsive Force

5.3 Law of Conservation of Momentum

5.4 Collision Between Two Rigid Bodies

5.5 Newton's Experimental Law of Collision, Coefficient of Restitution

6. Circular Motion:

6.1 Concept

6.2 Motion under Constant Velocity

6.3 Motion under Constant Acceleration

6.4 Relationship between Linear Velocity and Angular Velocity

6.5 Centrifugal and Centripetal Forces, their Applications

7. Work, Power and Energy:

7.1 Work Done by a Constant Force

7.2 Work Done by Uniform Variable Force

7.2.1 Power, 7.2.1.1 Indicated Power

7.2.1.2 Brake Power, 7.2.1.3 Efficiency

7.2.1.4 Power required for an Engine on Horizontal and Inclined (smooth and rough) Planes.

7.2.2 Energy, 7.2.2.1 Potential Energy

7.2.2.2 Kinetic Energy of Rectilinear Motion, 7.2.2.3 Kinetic Energy of Circular Motion

PRACTICAL AND SESSIONALS

DP-207 ENGINEERING DRAWING

1. Introduction of Drawing Instruments.

2. Lines, Lettering and Dimensioning:

2.1 Types of Line

2.2 Lettering – Single Stroke, Italics

2.3 Various Systems of Placing the Dimensions

3. Geometrical Construction and Engineering Curves:

3.1 Regular Polygons of Given Side

3.2 Conic sections – Construction of Ellipse, Parabola, Hyperbola

3.3 Construction of Cycloid, Epicycloid and Hypocycloid

3.4 Construction of Involute, Archimedian Spiral and Cylindrical Helix

4. Scales:

4.1 Type of Scales (Reducing and Enlarging)

4.2 Representative Fraction
4.3 Plain and Diagonal Scales

5. Theory of Orthographic Projections :

5.1 Introduction of Projections, Reference Planes and Projectors
5.2 Angle of Projections (First Angle and Third Angle Projections)
5.3 System of Rotations
5.4 Projection of Points in Different Quadrants

6. Projection of Lines :

6.1 Parallel to Both the Planes
6.2 Parallel to One and Perpendicular to Other Planes
6.3 Parallel to One and Inclined to Other Planes
6.4 Inclined to Both the Planes
6.5 True Length of a Line and its Apparent and True Inclinations

7. Projection of Planes:

7.1 Projection of Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular Planes.
7.2 Plane Parallel to One & Perpendicular to Other
7.3 Plane Perpendicular to Both the Planes.
7.4 Plane Perpendicular to One and Inclined to Other Plane.

8. Projection of Solids :

8.1 Projection of Cube, Prism, Pyramid, Cylinder and Cone
8.2 Projection of Solid whose Axis is Perpendicular to One and Parallel to Other plane.
8.3 Projection of Solid Whose Axis is Parallel to One and Inclined to Other Plane.
8.4 Projection of Solid Whose Axis is Parallel to both the Planes (excluding inclined to both the planes)

9. Conversion of Pictorial Views into Orthographic Views:

9.1 Orthographic Projections of Simple Solid Object from Pictorial / Isometric view

1. Preparation of following on Imperial Size Drawing Sheet:-

1.1 Lines, Letters and Scales
1.2 Geometrical Constructions and Engineering Curves.
1.3 Projection of Lines
1.4 Projection of Planes
1.5 Projection of Solids
1.6 Orthographic Projections of Simple objects
1.7 Section and Development of Surfaces of Solids i.e. Cone, Cylinder, Sphere etc.
1.8 Section and Development of Surfaces of Prism and Pyramids
1.9 Isometric Projections

DP-209 COMPUTER LAB

AS PER THE SYLLABUS OF THEORY.

DP-209 MECHANICS LAB

1. Use of Engineering Calculator.
2. Verification of the Law of Parallelogram and Polygon of Forces
    2.1 By using Force Board
    2.2 By using Force Table
3. Verification of the Principle of Moments in case of
    3.1 Compound Lever
    3.2 Bell crank Lever
4. Determination of Reactions in Case of Simply Supported Beams.
5. To Determine Coefficient of Friction between two Surfaces on
    5.1 Horizontal Plane
    5.2 Inclined Plane.
6. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Simple Wheel and Axle
7. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of differential Wheel and Axle
8. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Single Purchase Crab
9. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Double Purchase Crab
10. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Worm and Worm Wheel
11. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Screw Jack
12. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of First System of Pulleys
13. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Second System of Pulleys
14. Determination of Mechanical Advantage, Velocity Ratio and Efficiency of Third System of Pulleys.
15. Determination of Value of "g" by Simple Pendulum.

DP-210 CHEMISTRY LAB

1. Identification of Acid and Basic Radicals in a Salt (Total Numbers = 5)
2. Analysis of a Mixture Containing Two Salts (Not Containing Interfacing Radicals). (Total Numbers = 5)
3. Determination of Percentage Purity of an Acid by Titration With Standard Acid.
4. Determination of Percentage Purity of a Base by Titration With Standard Alkali Solution.
5. Determination of the Strength of Ferrous Sulphate using Standard Ferrous Ammonium Sulphate and Potassium Dichromate as Intermediate Solution
6. Determination of the Strength of Farrous Sulfate Solution using Standard Solution of Thiosulphate.
7. Determination of the Strength of Copper Sulphate Solution using a Standard Solution of thio Sulphate.
8. Determination of pH Values of Given Samples.
9. Determination of Hardness of Water by EDTA Method.
10 Estimation of Free Chlorine in Water.
11. Determination of Acid Value of an Oil.
12. Preparation of Soap.