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## *DIPLOMA (CIVIL) – SECTION A*

| S.N | Code | Name of Module | CR | SN | Code | Name of Module | CR |
|---|---|---|---|---|---|---|---|
| 1 | MC25-01 | English-I | **4** | 2 | MC25-02 | Applied Mathematics | **5** |
| 3 | MC25-03 | Applied Physics | **5** | 4 | MC25-04 | Applied Chemistry | **5** |
| 5 | MC25-05 | Applied Mechanics | **4** | 6 | MC25-06 | Basics of Mechanical Engineering | **4** |
| 7 | MC25-07 | Engineering Drawing | **4** | 8 | MC25-08 | Concepts in Information Technology | **5** |
| 9 | MC25-09 | Workshop Technology – I | **4** | 10 | MC25-10 | Business Communication | **4** |

**Subject Name:** English-I

1. **Functional Grammar:** Patterns & Parts of speech Subject, Predicate, Noun, Pronoun, Adjective, Adverb, Verb, Verb phrases, Conjunction, Interjection.
2. **Vocabulary:** Word formation, Prefix, Suffix, Compound words, Conversion, Synonyms, Antonyms, Homophones and Homonyms, How to look up a dictionary.
3. **Communication:** Meaning & importance of communication, Barriers to effective communication, Channels of communication, Language as a tool of communication.
4. **Requisites of Sentence writing:** Fragmented sentences, A good sentence, expletives, Garbled sentences, Rambling sentences, Loaded sentences, Parallel Comparison, Squinting construction, Loose & periodic sentences.

**Subject Name:** Applied Mathematics

1. Quadratic Equations
2. Arithmetic Progressions
3. Geometric Progressions
4. Partial Fractions
5. Permutations
6. Combinations
7. Binomial Theorem (For Positive Integral Index)
8. Binomial Theorem (For Fractional Index)
9. Measurement of Angles
10. Trigonometric Functions
11. Trigonometric Functions of Sum and Difference of Two Angles
12. Transformation Formulae
13. Trigonometric Functions of Multiple and Sub-Multiple Angles
14. Relations Between the Sides and the Trigonometric Ratios of the Angles of a Triangle
15. Area of a Triangle
16. Solution of Triangles
17. Cartesian Coordinates (Two Dimensions)
18. Locus
19. Straight Lines

20. Circles
21. Plotting of Curves
22. Translation of Axes
23. Parabolas
24. Ellipses
25. Hyperbolas
26. Polar Coordinates

**Subject Name:** Applied Physics

1. **Units and Dimensions:** Fundamental and Derived Units in SI System, Dimensions of Physical Quantities, Principle of Homogeneity Dimensional Equation, Applications of Dimensional Analysis: Checking the Correctness of Physical Equations, Derivation of Simple Physical Relations, Limitation of Dimensional Analysis, Significant Figures and Error Analysis.
2. **Force and Motion:** Scalars and Vectors, Velocity & acceleration, Equations of Motion, Newton's Law of Motion, Force & its Derivation from Newton's Laws of Motion, Composition and resolution of forces, Parabolic Motion Horizontal Projection and Projection at an angle, Time of Flight, Horizontal Range and Maximum Horizontal Range, Simple Problems, Centripetal Acceleration, Centripetal and Centrifugal Forces, Concept of Friction and its Application, Application to Banking of roads.
3. **Work, Power and Energy:** Work and its Units, Work Done on Bodies Moving on Horizontal and Inclined Planes (Consider Frictional Forces Also). Concept of Power and its Units, Calculations of Power (Simple Cases), Concept of Kinetic Energy and Potential Energy Expressions for P.E and K.E, Conservation of Energy in the Case of Freely Falling Bodies, Principle of Conservation of Energy.
4. **Rotational and Simple Harmonic Motions:** Definition of Moment of Inertia, Moment of Inertia of Disc, Ring, & Sphere, Torque and Angular Momentum and Their Inter Relation, Principles of Conservation (Angular Momentum and its Applications). Kinetic Energy of Rolling Body, S.H.M – Derivation of Displacement, Velocity, Acceleration, Time Period and Frequency, Motion of Cantilever, Free, Forced and Resonant Vibrations (No Derivation).
5. **Heat- Temperature and its Measurement:** Concept of Heat and Temperature on the Basis of K.E. of Molecules, Unit of Heat Basic Principles of Measurement of Temperature, Thermocouple, Bimetallic and Resistance, Pyrometers and Thermometers Criteria for the Selection of Thermometers.
6. **Expansion of Solids:** Coefficient of Linear, Surface and Cubical Expansions and Relation Amongst Them, Thermal Stresses (Qualitative Only) and their Applications.
7. **Heat Transfer:** Three Modes of Transfer of Heat, Coefficient of Thermal Conductivity, its Determination by Searle's Method and Lee's Disc Method, Conduction Through Compound Media (Series and Parallel for Two Materials Only), Heat Radiation, Characteristics of Heat Radiations, Prevost's Theory of Heat Exchange, Black Body Radiations, Emissivity and Absorptivity Kirchhoff's Law and Stefan's Law of Radiation.

**Subject Name:** Applied Chemistry

1. **Structure of Atom:** Chemistry as Important Branch of Science, Basic Concept of Elements Mixture and Compound, Chemical Equation, its Balancing, Implications and Limitations, Recapitulation of Fundamental Particles of Atom i.e., Electron, Proton and Neutron, Bohr's Model of Atom, Line Spectrum of Hydrogen, Modern Concept of Atom-Four Quantum Numbers, Shells, Subshells, Orbital (Shapes of s & p Orbital), Pauli's Exclusion Principle, Aufbau Energy Ranking Rule, Orbital Concept Types of bonds co-valency, formation of s-s, s-p, p-p, bonding with examples,

Hybridization sp, $sp^2$, $sp^3$, (Consider $BeF_2$, $BF_3$, $CH_4$) molecules, Brief Concept of Modern Periodic Table of Elements.

2. **Chemical Equation, Oxidation & Reduction:** Concept of Oxidation & Reduction, Electronic Concept of Oxidation & Reduction, Redox Reactions (Direct and Indirect), Oxidation Number Balancing of Simple Redox Reactions by Oxidation Number.
3. **Ionic Equilibrium:** Ionization, Degree of Ionization, Focus Effecting Ionization, Ionization of Water, Ionization Equilibrium in Aqueous Solutions, Common Ion Effect.
4. **Acids and Bases:** Concept of Acids and Bases, Their Strength in Ionization Constant, PH Value, Acid Base Titration, Choice of Indicators, Hydrolysis, Buffer Solution.
5. **Electrolysis:** Concept of Electrolysis, Faraday's Law of Electrolysis, Engineering Applications (Electro-Metallurgy, Electroplating & Electro-Refining)
6. **Water:** Hard and Soft Water, Removal of Hardness by: Soda Lime Process, Permutit's Process, Ion Exchange Method., Disadvantages of Hard Water in Industrial User, Boiler Scales, Priming, Foaming Corrosion and Caustic Embrittlement, Expressing the Degree of Hardness of Water in (With Simple Problems): Clark's Degree, O' Hener's Method, Determination of Degree of Hardness by (With Simple Problems): Soap Titration Method, O' Hener's Method: Water for Drinking Purposes.
7. **Solutions & Colloids:** Solute, Solvent, Solution & Colloids, Particle Size and Colloidal State, Tyndell Effect, Brownian movement, Coagulation.

**Subject Name:** Applied Mechanics

1. **Introduction:** Concept of Mechanics and Applied Mechanics, Explanation of Mechanics and Applied Mechanics, Its Importance and Necessity, Giving Suitable Examples on Bodies at Rest and in Motion, Explanation of Branches of this Subject, Concept of Rigid Bodies.
2. **Laws of Forces:** Force and its Effects, Units and Measurement of Force, Characteristics of Force Vector Representation, Bow's Notation, Types of Forces, Action and Reaction, Tension, Thrust and Shear Force, Force Systems: Coplanar and Space Force Systems, Coplanar Concurrent and Non-Concurrent Forces, Free Body Diagrams, Resultant and Components Concept of Equilibrium, Parallelogram Law of Forces, Equilibrium of Two Forces, Superposition and Transmissibility of Forces, Newton's Third Law, Triangle of Forces, Different Cases of Concurrent Coplanar, Two Force Systems, Extension of Parallelogram Law and Triangle Law to Many Forces Acting at One Point-Polygon Law of Forces, Method of Resolution into Orthogonal Components for Finding the Resultant, Graphical Methods, Special Case of Three Concurrent, Coplanar Forces, Lami's Theorem.
3. **Moments:** Concept of Moment, Varigon's Theorem- Statement Only, Principle of Moments-Application of Moments to Simple Mechanism, Parallel Forces, Calculation of their Resultant, Concept of Couple Properties and Effect, Moving a Force Parallel to its Line of Action, General Cases of Coplanar Force System, General Conditions of Equilibrium of Bodies Under Coplanar Forces.
4. **Friction:** Concept of Friction, Laws of Friction, Limiting Friction and Coefficient of Friction, Sliding Friction.
5. **Centre of Gravity:** Concept of Gravity, Gravitational Force, Centroid and Center of Gravity, Centroid for Regular Lamina and Center of Gravity for Regular Solids, Position of Center of Gravity of Compound Bodies and Centroid of Composition Area, CG of Bodies with Portions Removed.
6. **Laws of Motion:** Concept of Momentum, Newton's Laws of Motion, Their Application, Derivation of Force Equation from Second Law of Motion, Numerical Problems on Second Law of Motion, Piles, Lifts, Bodies Tied with String, Newton's Third Law of Motion and Numerical Problems Based on it, Conservation of Momentum, Impulsive Force (Definition Only).

7. **Simple Machines:** Concept of Machine, Mechanical Advantage, Velocity Ratio and Efficiency of a Machine, their Relationship, Law of Machine, Simple Machines (Lever, Wheel and Axle, Pulleys, Jacks Winch Crabs Only).

**Subject Name:** Basics of Mechanical Engineering

1. **Source of Energy:** Introduction, Types of Energy.
2. **Steam and its Properties:** Introduction to Steam, Terms Related to Steam Formation.
3. **Boiler:** Classification of Boilers, Merits and Demerits, Boiler Mounting.
4. **Prime Movers:** Definition of Prime Movers, Impulse and Reaction Turbines, Open and Close Cycle Gas Turbine.
5. **Internal Combustion Engines:** Heat Engine, External and Internal Combustion Engine, Classification of IC Engines, Principle Parts of IC Engines.
6. **Refrigeration and Air Conditioning:** Types of Refrigeration System, VCRS, Air Conditioning.
7. **Welding, Soldering and Brazing:** Welding, Classification of Plastic and Fussion Welding, Arc Welding, Types of Electrode, Brazing and Soldering.
8. **Machine Tools:** Introduction, Classification of Lathes, Major Parts of a Lathe, Specification of Lathe, Drilling Machine Operations, Milling and Down Milling, Grinding Machines.
9. **Lubrication and Bearings:** Introduction to Lubrication, Function and Properties of Lubricants Classification of Bearings.
10. **Power Transmission:** Belt Drives, Belt Material, Gear Train, Types of Gears, Compound Gear Train.
11. **Mechatronics:** Concept of Mechatronics System, Elements of Measurement System, Types of Control Systems, Microprocessor Based Controllers.

**Subject Name:** Engineering Drawing

1. **Drawing Office Practice:** Importance of Engineering Drawing, Importance of Legible Lettering and Numbering, Dimensioning, Scales, Geometrical Construction, Conics, Geometric Curves.
2. **Orthographic Projections, Projection of Simple Objects in three views.**
3. **Projection of Solids and Section of Solids:** Projection of Simple Solids, Sectional View.
4. **Pictorial Drawing:** Isometric Drawings.
5. **Development of Surfaces.**
6. **Practice on AutoCAD:** AutoCAD Commands, Exercise.

**Subject Name:** Concepts in Information Technology

1. **Information Concepts & Processing:** Definition of Information, Data VS Information, Introduction to Information System, Information Representation Digital Media, Images, Graphics, Animation, Audio, Video etc. Need a Value & Quality of Information the concept of Information entropy & Numerical.
2. **Computer Appreciation:** Definition of electronic Computer, History, Generation, Characteristics & Application of Computers, Classification of Computers, RAM, ROM, Computer Hardware, CPU, Various I/O Devices, Peripherals, Storage Media, Software Definition and Concepts.
3. **Data Communication & Networks:** Computer Networks, Networking of Computers, Introduction to LAN, WAN, MAN, Network Topologies, Basic Concepts in Computer Networks, Introduction to GPRS, CDMA, GSM & FM Technologies.
4. **Introduction to Internet Technologies:** HTML, DHTML, WWW, FTP, TELNET, Web Browser, Net Surfing, Search Engines, E-Mail, ISP, E-Commerce, Public Key, Private Key, Safety of Business Transaction on Web.

5. **Concepts in Operating System:** Elementary Concepts in Operating System, GUI, Introduction to DOS, MS Windows.

**Subject Name:** Workshop Technology

1. **Carpentry and Painting Shop:** Introduction to Wood Work, Preparation of Dovetail Joint, Preparation of Mitre Joint, Preparation of Lengthening Joint etc…
2. **Fitting Shop:** Drill, Taps and Dies, Using a Hand Tap, Care and Maintenance of Measuring Tools, Height Gauge, Files, Preparation of Job Involving Threads, Using a Pipe Threading Set, Care of Pipe Cutters and Threading Sets.
3. **Welding Shop:** Gas Welding, Operation and Maintenance of Oxygas Equipment, Equipment Setup, Maintaining the Equipment, Oxygas Welding Techniques, Common Welding Joints Generally Made by Gas Welding, Proper Edge Preparation and Fit Up, Welding Procedure.
4. **Electric Shop:** Importance of Three Phase Wiring and Its Effectiveness, Two-Wattmeter Method of Power Measurement in a Three Phase Circuit, Connecting Single Energy Meter and testing it, Reading and Working out the Power and costing of Energy in a Single Phase Circuit.
5. **Electronic Shop:** Wire Rope, Various Types of Plugs, Sockets, Connectors Suitable for General Purpose Audio Video Use, Demonstrate the skill to make Facilities Solder Joint, Installation and Soldering of Printed Circuit Components, Soldering of PCB Components, Application of Solder and Soldering Iron Tip.

**Subject Name:** Business Communication

1. **Corresponding: (Official, Business and Personal):** One Letter from Each Category.
2. **Grammar:** Tenses, Narration, Punctuation.
3. **Essay.**
4. Reports.
5. Notices.
6. Note-Making and Summarizing.
7. Business Correspondence.