ANNEXURE - I
CHEMISTRY
(Common for all branches of Diploma in Engineering)

1. Atomic Structure: Introduction-Fundamental particles – Bohr's theory – Quantum numbers — Aufbau principle – Hund's rule – Pauli's exclusion principle- Electronic configurations of elementsup to atomic number 20, shapes of s,p,d orbitals.

2. Chemical Bonding:
Introduction – types of chemical bonds – Ionic bond taking example of NaCland MgO – characteristics of ionic compounds and covalent bond taking example H_2, O_2 ,N_2, HCl characteristics of covalent compounds.

3. Solutions:
Introduction solution classification of solutions, solute, solvent, concentration, mole concept–Molarity, –Normality, equivalent weight using acids, bases and salts, numerical problems on Molarity and Normality.

4. Acids and Bases:
Introduction – theories of acids and bases – Arrhinus, Bronsted –Lowry theory – Lewis acid basetheory – Ionic product of water - P^H and related numerical problems – buffers solutions – Applications.

5. Electrochemistry:
Conductors, insulators, electrolytes – electrolysis –Faraday's laws of electrolysis- numerical problems – Galvanic cell – standard electrode potential – electro chemicalseries –emf and numerical problems on emf of a cell.

6. Water Technology:
Introduction –soft and hard water – causes of hardness – types of hardness –disadvantages of hardwater – degree of Hardness, units and its relations– softening methods – per mutit process – ion exchange process –qualities of drinking water – municipal treatment of water for drinking purpose.

7. Corrosion:
Introduction - factors influencing corrosion - electrochemical theory of corrosion- composition cell,stress cell and concentration cells– rusting of iron and its mechanism – prevention of corrosion by a) coating methods, b) cathodic protection (sacrificial and impressive voltage methods).

8. Polymers:
Introduction – polymerisation – types of polymerisation – addition, condensation and co-polymerisation with examples – plastics – types of plastics – advantages of plastics over traditional materials – Disadvantages of using plastics ,thermo plastics and thermo stetting plastics– differences between thermo plastics and thermo

stetting plastics-preparation and uses of the following plastics : 1. Polythene 2. PVC 3. Teflon 4. Polystyrene 5. Urea formaldehyde –Rubber – natural rubber – processing from latex –Vulcanization – Elastomers – Buna-s, Neoprenerubber and their uses.

9. Fuels:

Definition and classification of fuels based on physical state and occurrence – characteristics of goodfuel - Extraction and Refining of petroleum - composition and uses of gaseous fuels. A) water gas b) producer gas c) natural gas d) coal gas e) bio gas f) acetylene

10. Environmental chemistry

Introduction – environment –understand the terms lithosphere, hydrosphere, atmosphere bio sphere, biotic component, energy component pollutant, receptor, sink, particulate, DO, BOD, Threshold limit value, COD- Air pollution - causes-Effects – acid rain, green house effect – ozone depletion – controlof Air pollution – Water pollution – causes – effects – control measures.

ANNEXURE - II

Number of Questions to be Set Unit Wise (TOTAL 25)

UNIT No	Topic	Marks
1.	Atomic Structure	3
2.	Chemical Bonding	2
3.	Solutions	3
4.	Acids and Bases	2
5.	Electrochemistry	4
6.	Water Technology	3
7.	Corrosion	2
8.	Polymers	3
9.	Fuels	1
10.	Environmental Chemistry	2
Total		25

ANNEXURE - III
MODEL QUESTIONS FOR CHEMISTRY

1. The normality of oxalic acid solution is found to be 0.05N. How many grams of oxalic acid ispresent in 100 ml of solution.
   1) 1.26
   2) 12.6
   3) 126
   4) 0.126

2. Which of the following is responsible for temporary hardness of water
   1) Ca CO_3
   2) Ca Cl_2
   3) Ca SO_4
   4) Ca $(HCO_3)_2$

3. The monomer of Rubber is----
   1) Isoprene
   2) Propene
   3) Polyisoprene
   4) Bakelite

ANNEXURE - I

CIVIL ENGINEERING

(SYLLABUS)

STRENGTH OF MATERIALS

UNIT:1 Simple Stresses and Strains-Curves for Ductile Materials-Mechanical Properties of Materials-Hooke's Law-Lateral Strain-Poisson's Ratio-Elastic Constants and The Relation between Them-Composite Sections- Resilience-Strain Energy-Gradual and Sudden Loading-Shear Force and Bending Moment Diagrams for Cantilever, Simply Supported, Fixed, Continuous and Overhanging Beams Subjected to Point Loads and UDL

UNIT:2 Theory of Simple Bending-Assumptions-Bending Equation-Bending Stresses-Section Modulus-Shear Stress Distribution Across Various Sections Like Rectangular, Circular and I-Sections.

THEORY OF STRUCTURES:

UNIT:3 Deflection of Cantilevers and Simply Supported Beams-Double Integration and Macaulay's Methods-Mohr's Theorems for Slope and Deflections-Calculation for Propped Cantilevers Subjected to Simple Loading-Analysis of Fixed And Continuous Beams of Uniform Section for Simple Loading Without Sinking of Supports. Columns and Struts-Types-Slenderness Ratio- Euler's and Rankine's Formulae for Axial Loading. Determination of Forces in Members of Statically Determinate, Plane and Pin-Jointed Trusses for Dead Loads Only. Dams and Retaining Walls-Conditions for Stability-Middle Third Rule-Rankine's Formula for Active Earth Pressure.

REINFORCED CONCRETE STRUCTURES:

UNIT:4 Grades of Concrete, Characteristic Strength, Modulus of Elasticity-I.S. 456 -2000-Philosophy of Limit State Design. Limit State of Strength and Serviceability, Partial Safety Factor-Design Strength of Materials and Design Loads-Assumptions. Analysis and Limit State Design Of Rectangular Beams-Singly, Doubly Reinforced and T-Beams. Shear in RCC Beams, Lintels and Sunshades-Development Length. Slabs-Analysis and Limit State Design of One-Way And Two-Way Slabs as Per IS.456-2000.Torsion Reinforcement. Design of Continuous Slabs and Beams-Deflection Check for Slabs And Beams. Detailing of Reinforcement in Singly Reinforced and Doubly Reinforced Simply Supported Beams of Rectangular Sections and Lintels, One Way and Two Way Slabs.

UNIT:5 Columns: Codal Provisions of I.S 456-2000-Short and Long Columns-Different Shapes-Design of Short Columns by Limit State Method-Long Columns- Concept, Effective Length for Different End Conditions. Footings-Isolated Column Footings-One Way Shear and Two-Way Shear. Stairs-Types, Loads on Stairs. Working Stress Method of Design: Basic Principles, Neutral Axis, Lever Arm-Design and Analysis of Singly Reinforced Simply Supported Rectangular Beams. Comparison of Limit State and Working Stress Methods.

SURVEYING:

UNIT:6 Chain Surveying- Purpose and Principle- Errors and Corrections- Different Operations in Chain Surveying- Obstacles – Methods of Calculation of Area. Compass Surveying-Purpose and Principle-Bearings-Traversing Using Prismatic Compass-Local Attraction-Errors. Levelling-Definitions - Component Parts-Errors - Classification of Levelling-Contouring-Characteristics and Methods. Theodolite- Principles and Component Parts- Fundamental

Lines and Relationship Among Them- Adjustments of Theodolite- Measurement of Horizontal and Vertical Angles-Errors-Traverse Computations- Bowditch and Transit Rule. Tacheometry-Principle-Stadia Tacheometry-Tangential Tacheometry, Total Station, Global Positioning System – Importance, G.I.S – Use and Applications in Civil Engineering

HYDRAULICS

UNIT:7

Fluid Properties-Specific Weight–Mass Density-Specific Gravity-Surface Tension-Capillarity-Viscosity. Atmospheric Pressure, Gauge Pressure and Absolute Pressure. Fluid Pressure on Plane Surfaces-Centre of Pressure, Measurement of Fluid Pressure Using Piezometer and Mano Meters. Types of Flows-Uniform, Nonuniform, Steady, Unsteady, Laminar and Turbulent Flows. Energies of Liquid in Motion-Continuity Equation. Bernoulli's Theorem-Pitot Tube-Venturi Meter. Flow Thorough Small and Large Orifices, Free Orifices, Submerged Orifices, Coefficients of Orifices- C_c, C_v and C_d. Flow Through Internal, External, Convergent and Divergent Mouthpieces. Types of Notches-Rectangular and Triangular, Flow Over Notches. Types of Weirs-Sharp Crested and Broad Crested-Mathematical Formulae for Discharge-Francis and Bazin's Equations.

UNIT:8 Flow Through Pipes-Major and Minor Losses-Chezy's and Darcy's Formulae for Loss of Head Due to Friction-HGL & TEL- Reynold's Number for Laminar and Turbulent Flows. Flow Through Open Channels-Rectangular and Trapezoidal-Chezy's Formula for Discharge - Kutter's and Manning's Equation for Chezy's Constants-Most Economical Sections. Centrifugal Pumps Without Problems. Classification of Turbines- Kaplan, Franci's and Pelton Wheel Without Problems-Use of Draft Tube. Hydro-Electrical Installations-Components and Uses.

IRRIGATION ENGINEERING

UNIT:9 Necessity of Irrigations- Perennial and Inundation Irrigation, Flow and Lift Irrigation, Principal Crops-Kharif and Rabi Seasons-Duty, Delta and Base Period. Methods of Irrigation-Check Flooding, Basin Flooding, Contour Bunding, Furrow, Sprinkler and Drip Irrigations. Hydrology – Rainfall, Types of Rain Gauges, Types of Catchments-Rain Fall and Run Off. Measurement of Velocity of Flow in Streams-Ryve's and Dicken's Formulae for Computing Maximum Flood Discharge. Classifications of Head Works-Component Parts of Diversion Head Works. Weirs and Barrages. Percolation and Uplift Pressures. Types of Reservoirs-Dead Storage, Live Storage and Surcharge Storage.

UNIT: 10 Storage Head Works-Different Types of Dams-Rigid and Non-Rigid Dams- Gravity Dams-Low and High Dams. Elementary Profile of a Dam. Failures of Gravity Dams-Drainage Galleries. Ogee and Siphon Spill Ways. Earth Dams— Types, Failures and Precautions. Phreatic Lines and Drainage Arrangements in Earthen Dams. Distribution Works-Classifications and Alignment of Canals-Typical Cross Section of a Canal-Berm and Balanced Depth of Cutting- Canal Lining. Lacey's Silt Theory. Cross Drainage Works–Types and Functions.

ANNEXURE - II

CIVIL ENGINEERING

(SYLLABUS)

DISTRIBUTION OF QUESTIONS UNIT WISE

Units	Topic	Questions
1 and 2	Strength of Materials	20
3	Theory of Structures	20
4 and 5	Reinforced Concrete Structures	20
6	Surveying	15
7 and 8	Hydraulics	15
9 and 10	Irrigation Engineering	10

ANNEXURE - II

CIVIL ENGINEERING

(SYLLABUS)

MODEL QUESTIONS

1. What is the Bending moment equation for a simply supported beam with uniformly distributed load, 'ω' with a span of 'l'

   1) $\frac{wl}{2}$ 2) $\frac{wl^2}{8}$ 3) $\frac{wl^2}{2}$ 4) $\frac{WL^2}{4}$

2. What is a long column with load w and effective length l with span to effective depth ratio

   1) $> \frac{l}{12}$ 2) $= \frac{l}{12}$ 3) $< \frac{l}{12}$ 4) $\geq \frac{l}{10}$

3. The Reduced bearing with W.C.B = 120^0

   1) N 30^0 E 2) S 60^0 E 3) N 30^0 W 4) S 30^0 W

4. What is the relation between c_d, c_v, c_c with orifices

   1) $c_d = \frac{cc}{c\,v}$ 2) $c_c = c_v \times c_d$ 3) $c_d = c_c \times c_v$ 4) $c_v = c_c \times c_d$

ANNEXURE-I

COMPUTER SCIENCE AND ENGINEERING

(SYLLABUS)

1. **Digital Electronics**: Number Systems-Logic Gates, Boolean Algebra and basic Combinational circuits-Flip-Flops-Counters and registers-Additional Combinational Circuits.

2. **Software Engineering**: Basics of Software Engineering Designs & Life Cycle Models-Software Project Management-Requirement Analysis & Specifications- Software Design, Coding-Software testing, Debugging, Reliability, Quality Management &Maintenance.

3. **Computer Organisation and Microprocessors**: CPU Organization-Information representation and Arithmetic Operations-Memory Organization-I/O Organization- Fundamentals of 8086 and Advanced Processors.

4. **Data structures through C**: Introduction to Data structures, Searching and Sorting-Linked Storage Representation-Linked Lists-Linear Data Structures-Stacks-Linear Data Structures-Queues-Non-Linear Data Structures-Trees.

5. **Computer Networks**: Introduction to Networks-LAN components, Devices, tools, and Network Topologies-Network Addressing and sub-netting-Networks protocols and management-Basic Network administration.

6. **Operating Systems**: Introduction to Operating system-Process management- Synchronization & Deadlocks-Memory Management-Disk scheduling and File Management

7. **DBMS**: Concepts of DBMS & RDBMS-Concepts of SQL-Basics of PL/ SQL- Advanced PL/SQL-Concepts of NoSQL & MongoDB.

8. **Object oriented Programming through C++**: Object oriented programming concepts & Introduction to C++-Functions, Arrays, Pointers &References- Constructors, Destructors & Operator Overloading- Inheritance& Virtual functions- C++ I/O & Templates.

9. **Java Programming**: Basics of java and overloading-Concepts of inheritance, overriding, Interfaces and Packages-I/O Streams and Collections-Exception handling and Multithreaded Programming-Applets, AWT and Event Handling.

10. **Web Technologies**: Principles of Web Designing and HTML Introduction- Various HTML tags and usage of style sheets-Understand XML and Client side scripting using Java Script-JavaScript Ajax and J Query-Web servers and Server side scripting using PHP.

ANNEXURE-II

COMPUTER SCIENCE AND ENGINEERING

(SYLLABUS)

DISTRIBUTION OF QUESTIONS UNIT WISE

S.No.	Unit	Questions
1	**Digital Electronics**	8
2	**Software Engineering**	8
3	**Computer Organization and Microprocessors**	12
4	**Data Structures through C**	10
5	**Computer Networks**	12
6	**Operating Systems**	12
7	**DBMS**	10
8	**Object Oriented Programming through C++**	10
9	**Java Programming**	10
10	**Web Technologies**	8

ANNEXURE-III

COMPUTER SCIENCE AND ENGINEERING

(SYLLABUS)

MODEL QUESTIONS

1. In a circular linked list, the insertion of a record involves modification of

    1. 3 pointers
    2. 4 pointers
    3. 2 pointers
    4. No pointers

2. Which of the following layer of OSI reference model deals with end to end communication?

    1. Presentation layer
    2. Session layer
    3. Network layer
    4. Transport layer

ANNEXURE I
ELECTRICAL & ELECTRONICS ENGINEERING

UNIT I:- BASIC ELECTRICAL ENGINEERING

Ohms and Kirchhoff's Laws, star/delta transformation, Network theorems, Power and Energy, Heating effects of Electric current, Magnetic effects, Electromagnetic Induction, Electrostatics, Batteries, Types of Electrical Engineering Materials – Conducting, Semi- conducting, Magnetic, Insulating, Di-electric – Properties and Uses.

UNIT II:- D.C. MACHINES, BATTERIES & MEASURING INSTRUMENTS:

D.C. Generators: Construction, Operation, types, EMF Equation, Windings, Characteristics, Efficiency and Parallel operation.

DC Motors: Principle of operation, Back EMF, Torque Equation, Types, armature reaction. Characteristics, Starters, Speed Control, Losses, Efficiency and Testing.

Measuring Instruments: Classification, Principle of Operation of moving Coil, Moving Iron, Dynamometer type, Induction type meters, Instrument Transformers, Induction type Energy meter, Measurement of Resistance, Transducers and Sensors – Types, Thermistor, Thermocouple, Pressure Transducers and Strain gauges, Electronic and Digital Instruments.

UNIT III:- A.C. CIRCUITS AND TRANSFORMERS:

A.C. Circuits: Fundamentals, Series and parallel R-L-C Circuits, Resonant circuits, Polyphase Circuits, Measurement of power by 2 Wattmeters.

Transformer: Single-phase Transformer, Construction, Operation, Equivalent circuit, regulation, efficiency, Testing and Parallel operation, Accessories of Transformers and Cooling. Three-phase Transformers, Auto-Transformers.

UNIT IV:- A.C. MACHINES

Alternators: Construction, Operation, EMF equation, regulation, testing and parallel operation.

Synchronous Motors: Operation and performance, effects of Excitation, 'V'-Curve and inverted 'V'- Curve, methods of Starting and uses.

Three-Phase induction Motors: Construction, Principle of Operation, Torque Equation, Slip-torque characteristics, losses, efficiency, speed control, starters.

Single-phase Induction Motor: Types, Principle of operation, applications. Single-phase commutator motors: Types, Principle of operation and applications.

UNIT V:-POWER SYSTEM GENERATION & PROTECTION

Generating Stations: Working, Components, Comparison of Thermal, Hydel, Nuclear and Gas Power stations. Pollution control, Combined Working, Power Stations auxiliaries, Characteristic Curves and Important Terms, types of tariffs, power factor correction and economy.

Power Systems Protection: Circuit Breakers – Types, Principles of operation and uses, Current Limiting reactors, Relays – Classification, Principle of Operation of Induction type over current relay, Directional and Non directional relays, differential relays and distance relays, Protection of alternators, Transformers, Bus-bars, Transmission lines, Lightening arrestors, neutral grounding.

UNIT VI:- TRANSMISSION AND DISTRIBUTION

Transmission and distribution: Types of supply systems, Transmission line parameters, inductance and capacitance, performance of short and medium lines, regulation, Ferranti effect, Corona, Basic concepts of HVDC Transmission, Advantage and disadvantages of HVDC Transmission.

Components of lines, supports, conductor spacing, ground clearance and sag, insulators, voltage distribution across the string, string efficiency, methods of improving string efficiency. Earthing and layout of sub-stations.

Cables – Classification, insulation resistance, specifications. Distribution – Radial and ring distributors, variation of load voltage.

UNIT VII: - ELECTRIC TRACTION

Electric Traction: Systems of Train Electrification, Speed-time Curves for different services, Schedule speed, Tractive Effort, Specific Energy Consumption, Traction system auxiliaries, Traction motor.

UNIT VIII:- ELECTRICAL ESTIMATION

Electric Wiring: Tools, Wires, Types of wiring, Accessories, Lamp Circuits, Estimating and costing of domestic, industrial, power, irrigation pump sets, over head lines and ii KV Sub Stations, Rural electrification, departmental tests, earthing, maintenance of electrical machines.

UNIT IX: BASIC ELECTRONICS AND DIGITAL ELECTRONICS

Semi-Conductor devices: N type & P type,, Zener diode, PNP and NPN Transistors, Transistor configurations, characteristics, power supplies – half and full wave rectifiers, Filters, Zener diode regulation, Special devices – UJT, FET, LED, SCR, Opto Coupler, Photodiode, Photo Transistor, CRO and Timers.

Amplifiers: Types, Principles of operation, Characteristics.

Oscillators: Types, operation and application of each.

Digital Electronics: Different numbering systems, inter Conversions Boolean Algebra, Logic families, performance of AND, OR, NOT, NOR, NAND gates, combinational Logic Circuits, sequential logic circuits, Resistors and Memories, A/D and D/A converters.

UNIT X:- POWER ELECTRONICS AND MICRO CONTROLLER

Power Electronic Devices: Construction and working of SCR, GTOSCR, DIAC, TRIAC, Volt-ampere characteristics, Triggering of SCR using UJT, Protection.

Converters, AC regulators, Choppers, Inverters and Cycloconverters:

Types of Converters, working of AC regulators and Choppers. Types of inverters, Principles of working, Basic principle of working of Cyclo converters.

Speed control of D.C. Motors by using converters and choppers, Speed control of induction motor by using AC Voltage regulators – V/F Control, Switched mode power supplies (SMPS), UPS.

Micro Controllers: Architecture of 8051, instruction set of 8051, programming concepts, peripheral ICS – Function, features.

ANNEXURE II

NUMBER OF QUESTIONS TO BE SET

ELECTRICAL & ELECTRICAL ENGINEERING

Unit No	TOPICS	MARKS
I	Basic Electrical Engineering	**7**
II	D.C. Machines, Batteries & Measuring instruments	
	D.C. Generators	**4**
	D.C. Motors	**4**
	Measurements Instruments	**4**
III	A.C. Circuits and Transformers	
	A.C. Circuits	**5**
	Transformers	**7**
IV	A.C . Machines	
	Alternators	**3**
	Sychronous Motors	**3**
	Three-Phase Induction Motors	**4**
	Single Phase Induction Motors	**2**
V	Power System generation & Protection	
	Generating Stations	**5**
	Power System	**5**
VI	Transmission and Distribution	**10**
VII	Electric traction	**8**
VIII	Electrical Estimation	**4**
IX	Basic electronics and digital electronics	
	Semi-Conductor devices	**3**
	Amplifiers	**2**
	Oscillators	**2**
	Digital Electronics	**4**
X	Power Electronics and Micro Controller	
	Power Electronics Devices	**4**
	Converters, AC regulators, Choppers, Inverters and Cycloconverters	**6**
	Micro Controllers	**4**
	Total	**100**

ANNEXURE III

MODEL QUESTIONS FOR ELECTRICAL AND ELECTRONICS ENGINEERING

1. The value of coefficient of adhesion will be high when rail are
   1) Greased
   2) Wet
   3) Sprayed with oil
   4) Cleaned with sand

2. Induction type single phase energy meters measure electric energy in
   3) kW
   4) Wh
   3) kWh
   4) VAR

3. If a 4 ohms resistor is connected across a 12 V voltage source the current in the resistor will be
   1) 1A
   2) 2A
   3) 3A
   4) 4A

4. Which of the following is known as Universal gate?
   1) AND
   2) OR
   3) NAND
   4) NOT

ANNEXURE I
ELECTRONICS AND COMMUNICATION ENGINEERING

1. ELECTRONIC DEVICES AND CIRCUITS: Semiconductor diodes – varactor diode – zener diode – Clippers and clampers-Transistors– FETs – UJT (characteristics only) – Power supplies – Rectifiers and Filters – HW, FW and Bridge type – RC , LC and CLC filters – Series and Shunt regulators – Transistor amplifiers – CE,CC and CB configurations – Biasing techniques-RC coupled – Transformer coupled amplifiers Differential amplifiers – Feedback, Power and Tuned amplifiers – Operational amplifiers – characteristics and applications – RC , LC and Crystal oscillators – Astable , Bistable and Monostable Multivibrators using Transistors and 555 timers- Schmitt Trigger – Sweep circuits – Miller and Bootstrap circuits.

2. CIRCUIT THEORY: Mesh current and Node voltage analysis – Crammer's Rule – Network theorems – Thevenin's, Norton's, Maximum Power transfer, Superposition and Reciprocity theorems–RC,RL,RLC Transients- Series and Parallel Resonance – Q- factor – Selectivity – Bandwidth –Linear wave shaping circuits. Transmission Lines – Characteristic Impedance –Reflection Coefficient – SWR – Transmission Line losses and Impedance matching.

3. ELECTRONIC MEASURING INSTRUMENTS AND AUDEO &VIDEO SYSTEMS
Analog Instruments – Extension of range of Ammeter, Voltmeter and Ohmmeter – FET voltmeter – Differential voltmeter – Digital instruments – Ramp –Dual Slope integration – successive approximation – digital frequency meter-digital LCR meter- CRO – CRT – time base generator – deflection sensitivity – triggered sweep circuits – CRO applications, AF Oscillator – RF Signal generator – AF and RF Power meters – Q meter – Distortion Factor Meter – Digital IC tester-Audio systems-Digital TV Fundamentals-LCD-HDTV-Smart TV-DTH-Touch screen technology.

4. INDUSTRIAL AND POWER ELECTRONICS: Thyristor family – SCR ,TRIAC, Power BJT –IGBT (characteristics, working principle and applications) — Series and Parallel Inverters– PWM inverters, – Single phase – SMPS – Off Line and On Line UPS – Opto electronic devices – LDR, Photo diode and transistor and Photo voltaic cell (characteristics and applications) – Transducers – LVDT – Strain Gauge, Thermistor, Thermocouple - Ultrasonics - Pulse echo flaw detector-Industrial heating methods-Basics of control systems-Transfer function-ROC-Open and closed loop systems(up to second order)

5. COMMUNICATION SYSTEMS: Analog – Need for modulation – Types of modulation – AM , FM , PM – Modulation Index – Bandwidth – Power requirements – Transmitters – Low level , High level and SSB types – Receivers – Super heterodyne – AM and FM receivers – characteristics – Sensitivity , Selectivity , Fidelity – IMRR and choice of IF – Wave Propagation – Ground , Sky and Space waves – Properties. Digital – Pulse modulation – PCM , Delta modulation – Data codes – Synchronous and Asynchronous transmission – error detection and correction - digital modulation – ASK ,FSK, PSK and QAM – generation and detection – Multiplexing – TDM , FDM – Multiple Access – TDMA.

6. ADVANCED COMMUNICATION SYSTEMS: Antennas– radiation resistance – beam width – polarization – directivity – efficiency – bandwidth – gain – front to back ratio – folded dipole – arrays – broadside – end fire – Yagi , Log periodic , Turnstile antennas – Parabolic

reflectors – beam width, gain and applications. Wave Guides – Rectangular – Dominant mode – Phase and Group velocity – Cut off wavelength - working principle and applications of Magnetron , Klystron ,TWT – Radar – range equation – Pulsed radars – indicators – duplexers – CW radars and MTI radars – Satellite communication – UP link and DOWN link frequencies – types of satellites – satellite on board – earth station systems – satellite applications – Fiber Optic communication – types of fibers – couplers, splices, connectors, switches , optical emitters and detectors – optical repeaters – Wave length Division multiplexing – Mobile Communication – cellular concept – AMPS , GSM , CDMAsystems.

7. DIGITAL ELECTRONICS: Number systems – Logic gates – Boolean algebra – Adders and Subtractors – Flip-flops – Registers and Counters – Memories – RAM, ROM, Flash ROM, NVROM – D/A converters – binary weighted – R-2R Ladder, - Counter type A /D Converter and Successive approximation A /D Converter.

8. MICROCONTROLLERS AND MICROPROCESSORS: 8051 Architecture – Instruction Set – subroutines – use of input and output machine related statements – time delay programme – assembler directives - peripheral ICs — 8086 Architecture – Instruction Set – Features of Pentium and its Derivatives.

9. DATA COMMUNICATIONS AND COMPUTER NETWORKS: Transmission Media – twisted pair – UTP –STP –Coaxial cable – Optical fiber – comparison – Shannon Capacity theorem – Network Topologies – BUS, STAR , RING – switching – Packet and Message switching – OSI architecture and functions – CSMA , CDMA and token ring – properties and operations – Wireless LAN – Blue tooth technology – WAN architecture – Packet transmission – ARPA Net – ISP and ISDN architectures – WAN Protocols – X .25 , Frame Relay , ATM ,TCP / IP features and comparison –Ports and Sockets – Domain Name System – POP and SMTP server – File transfer protocol – Proxy server and Web server architecture.

ANNEXURE II

Number of Questions to be Set Unit Wise

ELECTRONICS AND COMMUNICATION ENGINEERING

UNIT NO	TOPICS	Questions
I	**ELECTRONIC DEVICES AND CIRCUITS**	15
II	**CIRCUIT THEORY**	10
III	**ELECTRONIC MEASURING INSTRUMENTS**	11
IV	**INDUSTRIAL AND POWER ELECTRONICS**	10
V	**COMMUNICATION SYSTEMS**	15
VI	**ADVANCED COMMUNICATION SYSTEMS**	10
VII	**DIGITAL ELECTRONICS**	10
VIII	**MICROCONTROLLERS AND MICROPROCESSORS**	12
IX	**DATA COMMUNICATIONS AND COMPUTER NETWORKS**	07
	Total	**100**

ANNEXURE III

MODEL QUESTIONS FOR ELECTRONICS AND COMMUNICATION ENGINEERING

1. The largest unsigned decimal number that can be represented in binary using 6 bits is
    1. 63
    2. 64
    3. 127
    4. 128

2. A 0-10mA Ammeter with 30Ω internal resistance is to be extended to measure up to 20mA . What value of Shunt resistance is to be connected?
    1. 10 Ω
    2. 20 Ω
    3. 30 Ω
    4. 60Ω
3. The maximum value of modulation index in amplitude modulation is
    1. 10
    2. 5
    3. Infinite
    4. 1

ANNEXURE - I

ENGINEERING MATHEMATICS

(Common for all branches of Diploma in Engineering)

Unit-I:

Matrices:Matrices of 3rd order: Types of matrices-Algebra of matrices-Transpose of a matrix-Symmetric, skew symmetric matrices-Minor, cofactor of an element-Determinant of a square matrix-Properties-Laplace's expansion-singular and non singular matrices-Adjoint and multiplicative inverse of a square matrix-System of linear equations in 3 variables-Solutions by Crammer's rule, Matrix inversion method **.**

Partial Fractions: Resolving a given rational function into partial fractions.

Unit –II:

Trigonometry: Properties of Trigonometric functions – Ratios of Compound angles, multiple angles, sub multiple angles – Transformations of Products into sum or differenceand vice versa – Simple trigonometric equations – Properties of triangles – Inverse Trigonometric functions.

Complex Numbers: Modulus and conjugate, arithmetic operations on complex number—Modulus-Amplitude form (Polar form)-Euler form (exponential form)-Properties- De Movire's Theorem and its applications.

Unit – III : Analytical Geometry

Circles-Equation given center and radius-given ends of diameter-General equation-finding center and radius. Standard forms of equations of Parabola, Ellipse and Hyperbola – simple properties.

Unit – IV : Differentiation and its Applications

Functions and limits – Standard limits – Differentiation from the First Principles – Differentiation of sum, product, quotient of functions, function of function, trigonometric, inverse trigonometric, exponential, logarithmic, Hyperbolic functions, implicit, explicit and parametric functions – Derivative of a function with respect to another function-Second order derivatives –Geometrical applications of the derivative (angle between curves, tangent and normal) – Increasing and decreasing functions – Maxima and Minima (single variable functions) using second order derivative only – Derivative as rate measure -Errors and approximations - Partial Differentiation – Partial derivatives up to second order – Euler's theorem.

Unit – V : Integration and Its Applications

Indefinite Integral – Standard forms – Integration by decomposition of the integrand of trigonometric, algebraic, exponential, logarithmic and Hyperbolic functions – Integration by substitution – Integration of reducible and irreducible quadratic factors – Integration by parts – Definite Integrals and properties, Definite Integral as the limit of a sum – Application of Integration to find areas under plane curves and volumes of Solids of revolution – Mean and RMS value.

Unit – VI: Differential Equations

Definition of a differential equation-order and degree of a differential equation- formation of

differential equations-solution of differential equation of the type first order, first degree, variable-separable, homogeneous equations, exact, linear differential equation of the form *dy/dx* + Py = Q, Bernoulli's equation, nth order linear differential equation with constant

coefficients both homogeneous and non homogeneous and finding the Particular Integrals for the functions e^{ax}, x^m, *Sin ax, Cos ax.*

ANNEXURE - II
FOR DIPLOMA HOLDERS
MATHEMATICS (Common Syllabus)

Number of Questions to be Set Unit Wise (Total 50)

UNIT NO	TOPICS	MARKS
I	Matrices	05
	Partial Fractions	02
II	Trigonometry	10
	Complex numbers	02
III	Analytical geometry	06
IV	Differentiation and its applications	10
V	Integration and its applications	08
VI	Differential equations	07
TOTAL		50

ANNEXURE - III

FOR DIPLOMA HOLDERS

MODEL QUESTIONS FOR MATHEMATICS

1. The maximum value of $5+8\cos\theta+6\sin\theta$ is

1) 25
2) 19
3) 15
4) 5

2. The value of $\cos10^0\cos50^0\cos70^0$ is

1) $\frac{\sqrt{3}}{4}$
2) $\frac{\sqrt{3}}{2}$
3) $\frac{\sqrt{3}}{6}$
4) $\frac{\sqrt{3}}{8}$

3. If $\sec2\theta=\frac{-2}{\sqrt{3}}$ then the general solution θ is

1) $2n\pi\pm\frac{5\pi}{6}$
2) $n\pi\pm\frac{5\pi}{6}$
3) $n\pi\pm\frac{5\pi}{12}$
4) $2n\pi\pm\frac{\pi}{6}$

4. The eccentricity of the ellipse $3x^2+2y^2=6$ is

1) $\frac{1}{3}$
2) $\frac{1}{\sqrt{3}}$
3) $\frac{1}{4}$
4) $\frac{1}{2}$

5. $\int_0^1 \frac{xe^x}{(1+x)^2}dx=$

1) $\frac{e-2}{2}$
2) e-2
3) $\frac{e-1}{2}$
4) e-1

ANNEXURE-I

MECHANICAL ENGINEERING

Unit I: Workshop Technology and Conventions in Drawing

Basic Workshop tools and Operations in carpentry, fitting and sheet metal. Forging processes and tools - Cold and hot working processes. Pattern types – types of moulding sand and their properties - Defects in casting. Conventions in machine drawing – Production drawing – limits, fits & Tolerances – Surface finish – Specifications of standard components.

Unit II: Production Technology and Computer Aided Manufacturing Systems.

Equipment used in arc and gas welding. Modern welding methods – Submerged arc, atomic, hydrogen, CO_2, and Ultrasonic welding. Defects in welding.
Working and operations of Lathe, Drilling, Shaper, Slotter, Planner and Milling machines – Jigs, Fixtures and Jig Boring – Modern Machining processes – Ultrasonic machining, Electric Discharge Machining, Abrasive Jet Machining, Laser Beam machining and Chemical machining – Surface finishing operations – Honing, Lapping, Super finishing, Electro plating, Metal spraying.
Basic components of NC and CNC machines – CNC part programming - Manual and Computer assisted - Material handling in Computer Aided Manufacturing Systems – AGVs – Robots – Flexible Manufacturing Systems - Computer Integrated Manufacturing Systems and Rapid Prototyping.

Unit III: Engineering Materials and Solid Mechanics

Mechanical properties of materials – Destructive and Non-destructive testing of materials, Production of Iron and Steel – Iron Carbon equilibrium Diagram - Heat treatment processes – Plain Carbon and Alloy steels – Ferrous and Non-ferrous metals and alloys.

Resolution of Forces, Simple Machines, Simple stresses and strains – Shear force and bending moment diagrams – Strain energy – Deflection of beams – Torsion in shafts.

Unit IV: Theory of Machines and Design of Machine Elements

Belt and Chain drives – Velocity ratio, Belt tensions and centrifugal tension – Effect of belt thickness – Slip, lengths of open and cross belting – Power transmitted by belt, Simple, Compound, and epicyclic gear trains – Roller and Silent chains – Flywheels and Governors-Cams.

Design of – Bolted joints, Riveted joints and Welded joints - Shafts, Keys and Couplings– Bearings and Springs.

Unit V: Thermodynamics and Heat Power Engineering

Basic thermodynamics and Laws of Perfect gases, Thermodynamic processes, Air standard Cycles, fuels and combustion, I.C Engines - Two and Four stroke engines – Petrol and Diesel engines, Indicated and brake powers, Indicated and Brake thermal efficiencies, Air Compressors, Gas turbines and Jet propulsion.

Unit VI: Hydraulics and Fluid Power Systems

Basics of Fluid mechanics, Fluid Statics, Fluid Kinematics and Dynamics-Flow through pipes, Impact of Jets, Hydraulic turbines, Working principles and operation of reciprocating and centrifugal pumps, Hydraulic and pneumatic Circuit devices- Valves and Actuators.

Unit VII: Steam Boilers, Nozzles, Turbines and Condensers

Properties of Steam, Working, Performance of Boilers, Steam nozzles, Condition for maximum discharge – steam turbines – classification, Velocity diagrams for single stage impulse turbine and Reaction turbine- Steam Condensers.

Unit VIII: Refrigeration and Air Conditioning

Methods of refrigeration, Cycles and Analysis - Air, Vapor Compression and Vapor Absorption refrigeration, Refrigeration equipment – Air Conditioning and Psychrometry – Air Conditioning Equipment and Applications of Air Conditioning.

Unit IX: Industrial Management and Engineering

Work study, Inspection and SQC - Estimation and Costing – Basics of Industrial management, organization structures and behaviour, Production and materials management, Maintenance Management and Industrial Safety, Entrepreneurial development, Principles of ISO 9000.

Unit X: Energy Sources and Power Plant Engineering

Types of Renewable energy sources – Solar energy – Wind energy – Fuel cells – MHD generator – Bio energy – Tidal energy – Thermal power plants - layout, important elements in layout and supporting activities- Nuclear Power Plants – Nuclear Energy chain reaction, Nuclear fuels, Working Principle of Nuclear reactor such as PWR and BWR.

ANNEXURE II

Number of questions to be set (each question carries one mark)

MECHANICAL ENGINEERING

UNIT NO	TOPICS	MARKS
I	Workshop Technology and Conventions in drawing	12
II	Production Technology and Computer Aided Manufacturing Systems.	15
III	Engineering Materials and Solid Mechanics	12
IV	Theory of Machines and Design of Machine Elements	11
V	Thermodynamics and Heat Power Engineering	12
VI	Hydraulics and Fluid Power Systems	09
VII	Steam Boilers, Nozzles, Turbines and Condensers	10
VIII	Refrigeration and Air Conditioning	05
IX	Industrial Management and Engineering	08
X	Energy Sources and Power Plant Engineering	06
		100

ANNEXURE III

MODEL QUESTIONS FOR MECHANICAL ENGINEERING

1. Speed Control Valves are
    1. Flow Control Valves
    2. Pressure regulating Valves
    3. Non – Return Valves
    4. Direction Control Valves

2. A simply supported beam has a uniformly distributed load on it. The bendingmovement diagram is in the form of
    1. Rectangle
    2. Triangle
    3. Parabola
    4. Semicircle

3. The first law of Thermodynamics deals with conservation of
    1. Velocity
    2. Mass
    3. Momentum
    4. Energy

ANNEXURE - I
PHYSICS
(Common Syllabus for all Diploma Holders in Engineering)

Unit-1:

Units and dimensions: Physical quantity-fundamental and derived physical quantities-units-fundamental and derived units-SI units-multiples and sub-multiples in SIunits-advantages of SI units-dimensions and dimensional formulae-dimensionless quantities- applications and limitations of dimensional analysis-problems.

Unit-2: Elements of vectors:

Scalar and vector quantities-examples–graphical representation of a vector-types of vectors-addition and subtraction of vectors-triangle law-parallelogram law and its cases-polygon law-resolution of a vector-unit vectors (i, j, k)-dot product and cross product of two vectors-characteristics of dot and cross products-examples-problems.

Unit-3: Kinematics and Friction

Equations of motion-acceleration due to gravity-equations of motion under gravity-expressions for maximum height, time of ascent, time of descent, time of flight, velocity on reaching the point of projection-motion of a body projected from the top of a tower-projectile motion-examples-horizontal and oblique projections-expressions for maximum height, time of ascent, time of flight, horizontal range, magnitude and direction of resultant velocity-problems.

Friction-normal reaction-laws of friction-coefficients of friction-angle of friction-methods of reducing friction-advantages and disadvantages of friction-motion of a body over a smooth inclined plane and a rough inclined plane–problems.

Unit-4: Work, Power and Energy

Work, power and energy-definitions and units-potential and kinetic energies-examples and expressions-law of conservation of energy-problems .

Unit-5: Simple harmonic motion and acoustics

Definition-conditions of SHM-examples of SHM-expressions for displacement, velocity, acceleration, time period, frequency and phase of SHM-time period of a simple pendulum-seconds pendulum-problems. Sound-musical sound and noise-noise pollution-Effects and methods of control of Noise Pollution-Beats and echoe-problems-Doppler effect – Explanation, cases and Applications Acoustics of buildings-Reverberation-Sabines' formula- characteristics of a good building-problems.

Unit:6: Heat and Thermodynamics

Expansion of gases-Boyle's law-Absolute scale of temperature-charle's laws-Ideal gas equation-Universal gas constant and its value-SI Units-problems-external work done by a gas-isothermal process-adiabatic process-first law of thermodynamics and its applications to isothermal process and adiabatic process-two specific heats of a gas-relation between Cp and

Cv-problems-second law of thermodynamics and its applications.

Unit:7 Modern Physics

Photoelectric effect – explanation and its laws-applications of photoelectric effect (photocell) – critical angle and total internal reflection – optical fibers - principle, working , types and applications-concept of super conductivity – its properties and applications.

ANNEXURE - II

Number of Questions to be Set Unit Wise (TOTAL 25)

UNIT NO	TOPICS	MARKS
I	Units and Dimensions	02
II	Elements of Vectors	02
III	Kinematics and Friction	06
IV	Work, Power and Energy	03
V	Simple Harmonic Motion and Acoustics	05
VI	Heat and Thermodynamics	05
VII	Modern Physics	02
Total		25

ANNEXURE - III
MODEL QUESTIONS FOR PHYSICS

1. If young's modulus 'Y', surface tension 'S' and velocity 'V' are chosen as fundamental quantities, the dimensional formula for force is
    2. Y-5V-4S6
    3. $Y^{-3}V^{5}S^{5}$
    4. $Y^{-5}V^{-4}S^{5}$
    5. $Y^{-3}V^{-4}S^{6}$
2. A balloon moves up with constant velocity 10m/s. An object is dropped from it when itis at a height of 100 m above the ground. The distance between the object and the balloon after 5 sec is ($g=10m/s^2$)
    1. 120 m
    2. 125 m
    3. 100 m
    4. 150 m
3. The time period of an oscillating simple pendulum is 'T'. If its length is increased by 5 cm then the time period is 'T_1' and the time period is 'T_2' if the length is reduced by 5 cm. The relationship among T, T_1, T_2
    1. $T^2 = T_1^2+T_2^2$
    2. $T^2/2 = T_1^2+T_2^2$
    3. $2T^2 = T_1^2+T_2^2$
    4. $3T^2 = T_1^2+T_2^2$
4. A gas is heated through 4 K in a closed vessel. If its pressure is increased by 0.8%, the initial temperature of the gas is
    1. 227 K
    2. 454 K
    3. 454 ^oC
    4. 227 ^oC
5. If light travels through two media with velocities 2.5×10^8 m/s and 2×10^8 m/s respectively, the critical angle for the combination of the two media is
    1. $Sin^{-1}(4/5)$
    2. $Sin^{-1}(3/5)$
    3. $Sin^{-1}(2/5)$
    4. $Sin^{-1}(1/5)$