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DIPLOMA (CIVIL) – PART FOUR

Optional Early Certificate: - Certificate (Civil)

Syllabus:-

Sr. No.	Module Code	Name of Module	Credits	Total Marks
1	MC25-16	Transportation Engineering	**4**	100
2	MC25-17	Surveying & Leveling - I	**5**	100
3	MC25-18	Soil Mechanics & Foundation Engineering	**5**	100
4	MC25-19	Design of RCC Structures	**4**	100
5	MC25-20	Irrigation Engineering	**4**	100

Module Name: Transportation Engineering

1. **Introduction to Transportation Engineering:** Introduction to Transportation, Formation of Settlements, Mode of Transportation, Basic Premise of a Transportation System, Major Disciplines of Transportation.
2. **Geometric Design and Transportation Planning:** Geometric Design, road Classification, Width of Pavement of Carriageway, Transport Planning, The urban Transportation Planning Process (UTPP), Trip Generation.
3. **Traffic Management:** Regulation of Traffic, Public Transport, Count Data Processing, Distribution, Poisson distribution, Normal Distribution, Linear Regression, Road Accident Scenario, Factors Causing Accidents, Prevention of Accidents, Cost of Road Accidents, Parking Traffic Signals and Traffic Signs.
4. **Pavement Design, Construction and Maintenance of Road:** Pavement Design, Road Construction, Soil Stabilization, highway Maintenance, Maintenance System.
5. **Transport Economic and Other Modes of Transportation Engineering:** Transport Demand and Supply, Cost of Producing Transport Services, Pricing of Transport Services, Methods of Economic Analysis, Role of Railways, An Overview of Air Transportation, Rapidly changing Technology Water Transportation.

Module Name: Surveying & Leveling-I

1. **Introduction:** Surveying and Leveling, Objects of Surveying, Uses of Surveying, Classification of Surveying, General Principles of Surveying, Stages of Survey Operation, Scale, Types of Scale, Type of Vernier.
2. **Chain Surveying:** Introduction, Methods of Direct Measurements, Instruments used for Chaining, Ranging of Line, Testing and Adjustment of Chain, Degree of Accuracy in chaining, Methods of Chaining on slopping ground, chain and tape corrections, obstacles in chaining, solved examples, Errors in chaining, Electronic distance measurements, Geodimeter, Tellurometer,
3. **Chain Triangulation:** Introduction, Terms related to chain triangulation, Equipment for chain surveying, Field Book, Field Work, Instruments for setting out right angles, Conventional Symbols.
4. **Compass Surveying:** Introduction, Traversing, Principle of Compass surveying, basic definitions, calculation of included angles from bearing, calculation of bearings from included angles.
5. **Plane Table Surveying:** Principle of plane table survey, Instruments required for plane table survey, Temporary Adjustments of Plane table, Methods of Plane table surveying, Advantages and disadvantages of plane table survey.
6. **Levelling:** Object of leveling, uses of leveling, Basic definitions, Instruments used, Temporary adjustments of level, classification of leveling.
7. **Theodolite:** Introduction, Types of theodolite, Size of theodolite, Basic Definition, Some modern theodolites, The fundamentals lines of theodolite.

Module Name: Soil Mechanics & Foundation Engineering

1. **Nature of Soil:** Problems with soil, Phase relation in soil, Classification for engineering purpose, Soil Compaction, Field compaction methods and monitoring.
2. **Soil water and water Flow:** Soil water, Influence of Clay minerals, Effective stress Concepts in Soil, Darcy's law Permeability measurement in the laboratory, introduction to flow nets.
3. **Stress Distribution in Soil:** Stress Distribution, Westergaard's Solution, Compression and Consolidation of Soils, Normally Consolidated and Over-Consolidated clays, Analysis of Consolidation-Terzaghi's theory.
4. **Shear Strength of Cohesive :** Shear strength of Cohesive and Cohesion less soils, Mohr Coulomb failure theory, Measurement of shear strength, Direct shear, tri axial Compression, Drained and Untrained Behaviors of Clay and sand, Stress path for Conventional Triaxial test.
5. **Slope Stability:** Slope failure Mechanisms, total and effective stress analysis, Stability analysis for purely cohesive and C soils, Method of Slices, Taylor’s Stability number, slope Protection Measures.
6. **Foundation:** Well Foundation or Caisson Foundation, Machine Foundation, Loads in Foundation, Bearing Capacity of the Soil, Causes of Failures of Foundations, Requirement of Good Foundations.

Module Name: Design of RCC Structures

1. Details of reinforcement in a simply supported RCC beam (singly reinforced and doubly reinforced) with the given design data regarding the size and number of bars, stirrups their size and spacing.
2. Details of reinforcement for a RCC square and circular column with isolated square footing.
3. Details of reinforcement for a cantilever beam with given data regarding the size of the beam and the reinforcement.
4. Details of reinforcement in plan and section for a simply supported RCC one way slab with intermediate support and two-way slabs from the given data. Bar bending schedule should be prepared.
5. Details of reinforcement in a two storeyed RCC internal and corner column. In this, the details of reinforcement at the junction with beams must be shown from the given design data.
6. Details of reinforcement of the junction of a secondary beam with the main beam with the given data.

Module Name: Irrigation Engineering

1. **Introduction of Irrigation:** Definition, Necessity and Scope of Irrigation, Multipurpose River Valley Project, Benefits of Irrigation, Ill-Effects if Irrigation, History of Irrigation.
2. **Methods of Irrigation:** Modes or Methods of Applying water to crops, Uncontrolled or Wild Flooding, Free Flooding, Flooding by Contour Laterals, Border strip Flooding Method, Check flooding, Ring Basin Flooding, Zigzag and Furrow methods, Drip Irrigation.
3. **Water Requirement of Crops:** functions and Quality of Irrigation water, Types of Soils, Classes and Availability of Soil Water, Principal Crops and Crop Seasons, Duty and Delta, factors Affecting Duty, Soil Fertility Crop Rotation.
4. **Ground Water: Well Irrigation:** Definition of Aquiculture and Aquifuge, Divisions of Sub-Surface Water, Types of Aruifers, Tube Wells Other Sources of Under Ground Water.
5. **DAMS:** According to hydraulic Design, According to Material, Gravity Dams, Arch Dams, Buttress Dams, Timber Dams, Earth and Rock fill Dams, Selection of Site for a Dam.
6. **Flow Irrigation:** Canals Classification, Canal Alignment, Curves, Inundation Canals, Bandhara Irrigation.
7. **Water Logging:** Effects of Water Logging, causes of water logging, Remedial Measures, losser in Canal, Land Drainage.
8. **River Engineering:** Classification of River, Meandering, Causes of Meandering, the Aggrading Type of river, Cut off, River Training.
9. **Water Resources Planning:** India's Water Resources, Scenario of Water Use, Purpose of Water Resource Development Classification of Water Resource Development Projects, Strategies for the Future, Planning Strategies, Management Strategies.