

ANNEXURE -III**PAPER – I****CIVIL ENGINEERING (DIPLOMA STANDARD)****Objective Type****SUBJECT CODE: 299****UNIT - I: ENGINEERING MECHANICS**

Direct Stresses and strains (Tensile and compressive) due to Axial forces – Deformation of elastic bar due to uni-axial force - Shear force and bending moment diagrams for statically determinate beams - Geometrical properties of sections - Stresses in beams due to bending – Stresses in shafts due to torsion – Pin jointed perfect frames with vertical loads on nodal points (method of joints only).

UNIT - II: MECHANICS OF STRUCTURE

Deflection of cantilever and simply supported beams – Shear force and bending moment diagrams for statically indeterminate structures (Propped cantilever, Fixed Beams, continuous beams, Non-sway Portal frames) using Mohr's theorems and moment distribution method. Euler's and Rankin's formula for columns – Stresses due to eccentric loads – combined stresses due to direct loads and bending moments in rectangular sections.

UNIT - III: CONSTRUCTION MATERIALS & CONSTRUCTION PRACTICE

Bricks, Tiles, Cement, Fine Aggregate, Coarse Aggregate, Timber, Ply wood, Steel, Glass, Plastics, PVC, UPVC, Paints, Mortars, Concrete – Different types, qualities, requirements, standard specifications, Admixtures for cement mortar and concrete. Different types of Foundations, Masonry, Floors, Roofs, Doors and Windows, Weathering Course, Damp proof course, Plastering, Painting, Colour Washing – Specifications for different works.

UNIT - IV: TRANSPORTATION ENGINEERING

Roads – Different types – methods of formation of water bound macadam, bituminous and concrete roads – Hill roads – Requirements – Camber, gradient, super elevation, carriage way, pavements, drainage system, sight distance etc., Traffic Engineering, Bridges – Classification of bridges – Site selection and alignment – Foundation, substructure and super-structure. Sub-grade soil – Soil mass as a three phase system – Grain size classification - Atterberg limits – IS Classification of soils–Compaction – Shear strength – Road Arboriculture – Express Highways – Rapid Transport System.

UNIT - V: HYDRAULICS

Measurement of pressure in liquids – Pressure distribution and total pressure on immersed surfaces – Types of flow (Laminar, turbulent, steady, unsteady, uniform, nonuniform) – Flow through pipes – Losses – Hydraulic gradient and total energy lines. Bernoulli's theorem – use of Orifice, Mouthpiece, Orifice meter and Venturimeters – Flow through channels – Bazin's and Manning's formula – Economical sections for open channels, Pumps – Reciprocating pumps – Centrifugal pumps – Characteristics – Discharge – Power and efficiency, Ground water – Types of well – Test for yield of wells.

UNIT - VI: SURVEYING

Types of Surveys – Chain surveying – Compass surveying – Levelling – Contour surveying – Theodolite surveying – Trigonometrical levelling – Tacheometry – Field work – Simple problems. Curves, Global Positioning System (GPS), Remote sensing – Photogrammetric Surveying and Hydrographic Surveying, Total Station and Geographical Information System (GIS).

UNIT - VII: ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

Sources of water – Conveyance of water – Treatment of water – Quality of water – Tests on water – Distribution systems – Sewers – Collection and conveyance of sewage – Sewer Appurtenances – Drainage arrangements and Sanitary fittings in buildings – Treatment and disposal of sewage, Solid waste Management. Environmental pollution – Air – water – Soil – Noise – Pollution Control.

UNIT - VIII: ESTIMATING AND COSTING

Systems of taking out quantities – Trade and Group systems – Material requirement for different items of works – Preparation of data for works – Report writing – Valuation of buildings and properties – Fixation of rents – Approximate estimates – Detailed estimate and Abstract estimate for buildings, well, sump, septic tanks, compound wall, roads etc.

UNIT - IX: STRUCTURAL ENGINEERING

Reinforced cement concrete structure – Analysis and design of singly and Doubly reinforced rectangular and T-beam sections – Cantilever, simply supported, continuous beams – One way and two way slabs – Lintels and sunshades – Staircases – Rectangular and circular short columns – Isolated column footings. (All designs by Limit State Method only). Steel structures – simple beams – Tension and compression members – simple columns.

UNIT - X: CONSTRUCTION MANAGEMENT

Planning of a project – Factors to be considered – Project reports – Organization structure on construction departments – Construction planning – CPM and PERT networks – Contracts – Tenders and Tender documents – Bill- Supervision and Quality control – Safety measures in construction sites – Banking practice – Cash flow diagrams. Entrepreneurship, Ethics in Engineering, Use of computers – Information Management, Financial Management, Disaster Management – Types of Natural calamities – Causes for major disaster – Preparedness – Response and Recovery.

PAPER – I
ARCHITECTURAL ASSISTANTSHIP
(DIPLOMA STANDARD)

SUBJECT CODE: 323

UNIT – I: ENGINEERING MECHANICS

Simple Stresses and Strain – Stress and Strain – Modulus of Elasticity / Elastic constants – Application of stress and strain in engineering field – Behaviour of ductile and brittle material – Loads – Shear Force and Bending Moment – Geometrical properties of sections – Centroid – Moment of Inertia – Stress in Beams and Shafts – Stresses in Beams due to bending – Stress in shafts due to torsion – Pin Jointed Frames - Analytical Method – Graphical Method.

UNIT – II: BUILDING MATERIALS & CONSTRUCTION

Properties, characteristics, strengths, manufacturing, components & applications of materials & methods of construction & detailing for the following:

Stone – Brick & Clay Products – Lime – Cement – Timber – Concrete – Ferrous and Non-Ferrous Metals – Glass – Plastics – Asphalt, Sealants & Adhesives – Protective and Decorative Coatings – Water Proofing and Damps Proofing Materials – Rural Building Materials(Bamboo, Soil, etc.).

UNIT – III: HISTORY & THEORY OF ARCHITECTURE

History of Architecture

Egyptian Architecture – Greek Architecture – Roman Architecture – Early Christian & Byzantine Architecture – Gothic Architecture – Renaissance Architecture. Indian Architecture – Indus Valley Civilization, Buddhist Architecture, Hindu Architecture – Islamic Architecture in India. Modern Architecture, Post Modernism, Deconstructivism Contemporary World Architecture.

Theory of Architecture

Definition of Architecture – Architecture as satisfying functional, aesthetic & psychological human needs. Elements of Architecture – Form, Space, Light, colour, etc. Principles of Architecture – Proportion, Balance, Scale, Symmetry, etc.

UNIT – IV: STRUCTURAL ENGINEERING

Slope and Deflection of Beams – Propped Cantilevers – Fixed Beams – Arches – Continuous Beams – Theorem of Three Moments – Continuous Beams – Moment Distribution Method – Columns and Struts – Combined Bending and Direct Stresses– Earth Pressure and Retaining Walls – Working Stress Method Design of Beams for Flexure by L.S.M – Design of T-Beams and Continuous Beams by L.S.M – Design of Beams for Shear by L.S.M – Design of Oneway Slabs by L.S.M - Design of Twoway Slabs by L.S.M - Design of Staircases by L.S.M - Design of Columns by L.S.M - Design of Column Footings – Design of Simple Beams – Design of Tension Members – Design of Compression Members – Design of Welded Connections.

UNIT – V: ENVIRONMENTAL ENGINEERING

Sources of Water – Collections and Conveyance of Water – Quality of Water – Treatment of Water – Distribution System – Appurtenances and Maintenance of Water Lines – Collections and Conveyance of Sewage – Treatments and Disposal – Environmental Pollution and Control – Industrial Waste Water Treatment and Solid Waste Disposal – Land, Water & Air Pollution.

UNIT – VI: BUILDING SERVICES

Water Supply & Sewage Disposal, Mechanical Systems – Pumps & Motors, Electrical Systems – Generation & Distribution, Ventilation & Lighting, Air Conditioning – Principles, systems & applications, Vertical Transportation systems, Fire Hazards, Safety & Design Regulations, Acoustics.

UNIT – VII: SITE SURVEY & PLANNING

Chain Surveying – Compass Surveying – Plane Table Surveying – Levelling – Theodolite – Contouring – Minor Instruments.

Site Drawings – Site marking, Importance & procedures for making site drawings & dimensioning.

UNIT – VIII: SPECIFICATION & ESTIMATION

Stages of Detailed Estimate – Measurements & Material Requirement – Specification & Report Writing – Approximate Estimates – Areas and Volumes – Data – Valuation – Detailed Estimate.

UNIT – IX: TOWN PLANNING

Town Planning Principles – Road and Street Planning – Housing – Economy, Society, Environment and Transport Policy and Planning – Town Planning Rules, Building Bye-Laws & Development Control Rules.

UNIT – X: COMPUTER AIDED DRAFTING & VISUALIZATION

2D & 3D Drafting & Visualization - Using AutoCAD, etc- Setting limits and creating entities like LINE, ARC, CIRCLE etc – Editing the drawing with edit commands like TRIM, FILLET, COPY, MOVE etc., Creating 2D building working drawings.

Visualization using SKETCH UP, 3DMAX, etc.

PAPER – I**TOWN AND COUNTRY PLANNING (POST DIPLOMA STANDARD)****SUBJECT CODE: 325****UNIT – I: HISTORY OF HUMAN SETTLEMENTS**

Early human settlements, Town building during Indus valley civilization – Town building practices during ancient Greek and Roman period – Town building practices during Medieval and Renaissance periods – Effect of Industrial Revolution on planning of cities – Planning concepts of E.Howard, Patric Geddes, C.A.Perry.

UNIT – II: PLANNING PRINCIPLES

Principles of Town Planning – Green belt, Housing, Public Buildings, Recreational Spaces, Transportation, Zoning. Scope and Content of Master Plan, Land use Plan – Geographical study of Regional Landuses and distribution of Settlements – Elements of Regional planning, Regional Delineation, Rural Development.

UNIT – III: STATISTICS & COMPUTER ORIENTATION

Central Tendency computation – Sampling and Diagram – Computer Aided Drawing – Computer Application in Data Analysis – Population forecasting – Use of Computers in Planning.

UNIT – IV: SOCIO-ECONOMIC ASPECTS OF PLANNING

Basic concept & Scope of Study – Urbanization & Ecological theories – Social Issues in urban area – Housing Redevelopment – Citizen participation.

Economic Operation – Project Appraisal – Urbanization & National Housing policy – Economics of Urban Growth.

UNIT – V: PLANNING PRACTICE

Regional Plan concepts and studies – Masterplan concept and surveys – Masterplan needs and plan formulation – Urban Renewal, Redevelopment, Rehabilitation, Conservation – New Town - Detailed Development Plan - Development Regulations.

NIT – VI: PLANNING LEGISLATION AND ADMINISTRATION

Evolution of Planning Legislation - Planning System in U.K., The Tamil Nadu Town and Country Planning Act 1971, Coastal Regulation Zone and Tamil Nadu District Municipalities Building Rules – Hill Area Conservation – Planning related Acts.

UNIT – VII: ARCHITECTURE AND LANDSCAPE ARCHITECTURE

Introduction to Architecture. Principle of Aesthetics – Proportion, Scale, Balance, Rhythm, Hierarchy, Axis etc., – Study of Architectural spaces – Townscape Elements – Landscape Elements – Role of Landscape Architect and the importance of Environmental Protection – Landscaping the Public Areas, Commonly used Plants and Trees in Landscape.

UNIT – VIII: TRAFFIC AND TRANSPORTATION

Transportation systems – Urban Roads Classification – Traffic Regulations - Traffic Signs and Traffic Markings – Traffic Intersections at Grade-Traffic Intersections Grade Separated Parking & Street Light Facilities, Parking Standards – Railways Airways and Waterways Terminal Facilities Location Aspects – Layouts – Urban Transportation Planning Process-Surveys and Studies – Urban Transportation Planning Process – Forecasting and Plan Formulation.

UNIT – IX: PARKS, PLAY GROUNDS AND OPEN SPACES

General, Types of Recreation, Location of Urban Green Spaces, Classification of Parks, Park Design, Financing Parks, Play area and its types.

UNIT – X: REMOTE SENSING

Geometry of Aerial Photographs – Image characteristics and their significance
– Mapping by Manual and Mechanical Methods – Use of Satellites, Aerial Photographs, Drones in Physical Planning.

PAPER – I**MECHANICAL ENGINEERING****(DIPLOMA STANDARD)****CODE NO: 255****UNIT I: INDUSTRIAL MANAGEMENT:**

X and Y theories of Management, Contributions of Henry Fayol and F.W. Taylor for Management - job evaluation by Ranking method and factor comparison method - motivating techniques - fixing selling price of a product - break even analysis for make or buy decision - sinking fund method and straight line method of calculating depreciation - ABC analysis – determination of economic order quantity – TQM – ISO standards - certification

UNIT II: INDUSTRIAL ENGINEERING:

Factors influencing plant location - principles of layout - techniques used to improve layout - primary and secondary causes of an accident - personal protective devices - method study procedure - flow diagram, string diagram and two handed process chart - principles of motion economy-procedure for conducting stopwatch time study, production study and ratio delay study - objectives of preplanning, routing, scheduling, despatching and controlling - difference between inspection and quality control - types of plant maintenance - TPM

UNIT III: PRODUCTION TECHNOLOGY:

Foundry - patterns - special casting techniques - welding - hot and cold working – drawing, rolling and forging - powder metallurgy - plastics - rubber - ceramics - refractories - lathe work - planer - shaper - slotter - drilling machine - milling machines - grinding machines - broaching - boring and jig boring - - Gears manufacturing practice - Heat treatment and metal finishing - press work

UNIT IV: ELECTRICAL AND ELECTRONICS ENGINEERING:

Units, Ohm's law, Kirchoff's law, Faraday's law - D.C. Circuits, batteries - electro magnetism - single phase and three phase A.C. circuits - Induction motors – Electronics – diodes – resistors – capacitors – transistors – logic gates.

UNIT V: MECHANICS OF MATERIALS:

Mechanical properties of metals - simple stresses and strains – modulus of elasticity - geometrical properties of sections - thin cylinders bending moment and shear force - theory of simple bending - torsion and springs - transmission of motion – gear drives and belt drives.

UNIT VI: HEAT POWER ENGINEERING:

Working principle and comparison of otto and diesel cycles - construction and working of two stroke and four stroke engines - Heat balance test on I.C. engine - working principle of single and multistage compressors - Comparison of reciprocating and rotary compressors - classification of steam boilers - construction and working of steam turbines
 - working principle of steam power plant - Main elements of a nuclear power plant - Vapour compression cycle - factors affecting human comfort - working principle of a window air conditioner and central air conditioning system.

UNIT VII: COMPUTER APPLICATIONS:

Working principle and constructional details of computer - classification of computer – Input / Output devices - flow charting – MS Office & Star Office – creating documents – presentations – sending emails.

UNIT VIII: FLUID MECHANICS AND MACHINERY:

Working of differential manometer - use of venturimeter and orifice classification of mouth pieces meter - working of pelton wheel, francis turbine and kaplan turbine - construction and working principle of reciprocating pump, centrifugal pump and gear pump - quick return mechanism of shaping machine - table movement in a milling machine.

UNIT IX: COMPUTER INTEGRATED MANUFACTURING:

CAD – Definition – geometric modeling – wireframe, surface and solid modeling – graphic standards – GKS, IGES, PHIGS and DXF. CAM – definition – group technology – part families
 – parts classification and coding – CAPP – types. CNC – definition – components of CNC – ATC – CNC EDM. Part program – format – coordinate system – types of motion control – types of interpolation – G and M codes – sub program – canned cycles.

UNIT X: DESIGN OF MACHINE ELEMENTS:

Factors affecting selection of material – classification of bearings – sliding contact and rolling contact bearings – radial and thrust bearings – limits – fits – tolerance – classification of fits –cams and followers – types.

Paper-II
Part-A

கட்டாயத் தமிழ்மொழித் தகுதித்தேர்விற்கானபாடத்திட்டம்
(கொள்குறிவினாவிற்கானதலைப்புகள்)

பத்தாம் வகுப்பு தரம்

1. பிரித்தெழுதுதல் / சேர்த்தெழுதுதல்.
2. எதிர்ச்சொல்லை எடுத்தெழுதுதல்.
3. பொருந்தாச் சொல்லைக் கண்டறிதல்.
4. பிழைதிருத்தம் (i) சந்திப்பிழையை நீக்குதல் (ii) மரபுப்பிழைகள், வழுவச் சொற்களை நீக்குதல் / பிறமொழிச் சொற்களை நீக்குதல்.
5. ஆங்கிலச் சொல்லுக்கு நேரான தமிழ்ச்சொல்லை அறிதல்.
6. ஒலி மற்றும் பொருள் வேறுபாடறிந்து சரியான பொருளையறிதல்.
7. ஒருபொருள் தரும் பலசொற்கள்.
8. வேர்ச்சொல்லைத் தேர்வு செய்தல்.
9. வேர்ச்சொல்லைக் கொடுத்து / வினைமுற்று, வினையெச்சம், வினையாலணையும்பெயர், தொழிற்பெயரை / உருவாக்கல்.
10. அகரவரிசைப்படி சொற்களை சீர்செய்தல்.
11. சொற்களை ஒழுங்குப்படுத்தி சொற்றொடராக்குதல்.
12. இருவினைகளின் பொருள்வேறுபாடு அறிதல்.
(எ.கா.) குவிந்து-குவித்து
13. விடைக்கேற்ற வினாவைத் தேர்ந்தெடுத்தல்.
14. எவ்வகை வாக்கியம் எனக் கண்டெழுதுதல் - தன்வினை, பிறவினை, செய்வினை, செய்ப்பாட்டு வினைவாக்கியங்களைக் கண்டெழுதுதல்.
15. உவமையால் விளக்கப்பெறும் பொருத்தமான பொருளைத் தேர்ந்தெழுதுதல்
16. அலுவல்சார்ந்த சொற்கள் (கலைச்சொல்)
17. விடை வகைகள்.
18. பிறமொழிச் சொற்களுக்கு இணையான தமிழ்ச்சொற்களைக் கண்டறிதல் (எ.கா.) கோல்டுபிஸ்கட் - தங்கக்கட்டி.
19. ஊர்ப்பெயர்களின் மரூஉவை எழுதுக (எ.கா.) தஞ்சாவூர் - தஞ்சை
20. நிறுத்தற்குறிகளை அறிதல்.
21. பேச்சுவழக்கு, எழுத்துவழக்கு (வாரான் - வருகிறான்).
22. சொற்களை இணைத்து புதியசொல் உருவாக்கல்.
23. பொருத்தமான காலம் அமைத்தல்
(இறந்தகாலம், நிகழ்காலம், எதிர்காலம்).
24. சரியான வினாச்சொல்லைத் தேர்ந்தெடு.

25. சரியான இணைப்புச் சொல்
(எனவே, ஏனெனில், ஆகையால், அதனால், அதுபோல).
26. அடைப்புக்குள் உள்ள சொல்லைத் தகுந்த இடத்தில் சேர்க்க.
27. இருபொருள் தருக.
28. குறில் - நெடில் மாற்றம், பொருள் வேறுபாடு.
29. கூற்று, காரணம் - சரியா? தவறா?
30. கலைச்சொற்களை அறிதல் :-
எ.கா. - Artificial Intelligence - செயற்கை நுண்ணறிவு
Super Computer - மீத்திறன் கணினி
31. பொருத்தமான பொருளைத் தெரிவு செய்தல்
32. சொற்களின் கூட்டுப்பெயர்கள் (எ.கா.) புல் - புற்கள்
33. சரியான தொடரைத் தேர்ந்தெடுத்தல்
34. பிழைதிருத்துதல் (ஒரு-ஓர்)
35. சொல் - பொருள் - பொருத்துக
36. ஒருமை-பன்மைபிழை
37. பத்தியிலிருந்து வினாவிற்கான சரியான விடையைத் தேர்ந்தெடு.

Paper-II**Code No.003****Part-B**
General Studies (Diploma Standard)
(Topics for Objective Type)**1. GENERAL SCIENCE**

- i. Nature of Universe – Measurement of Physical Quantities – General Scientific Laws in Motion – Force, Pressure and Energy – Everyday application of the basic principles of Mechanics, Electricity, Magnetism, Light, Sound, Heat and Nuclear Physics in our daily life.
- ii. Elements and Compounds, Acids, Bases, Salts, Petroleum Products, Fertilizers, Pesticides, Metallurgy and Food Adulterants.
- iii. Main concepts of Life Science, Classification of living organisms, Evolution, Genetics, Physiology, Nutrition, Health and Hygiene, Human diseases.
- iv. Environmental Science.

2. CURRENT EVENTS

- i. Latest diary of events – National symbols–Profile of states –Eminent personalities and places in news–Sports –Books and Authors.
- ii. Welfare Scheme of Government – Political parties and Political system in Tamil Nadu and India.
- iii. Latest inventions in Science and Technology – Geographical Land Marks – Current Socio – Economic issues.

3. GEOGRAPHY

- i. Earth Location – Physical Features – Monsoon, rainfall, weather and climate– Water resources–Rivers –Soil, Minerals and Natural resources– Forest and Wildlife–Agriculture pattern.
- ii. Transport– Communication.
- iii. Population density and distribution in Tamil Nadu and India.
- iv. Calamities–Disaster Management–Environment – Climate change.

4. HISTORY AND CULTURE OF INDIA

- i. Indus Valley Civilization –Guptas, Delhi Sultans, Mughals and Marathas – South Indian History.
- ii. Characteristics of Indian Culture, Unity in Diversity–Race, Language, Custom.
- iii. India as a Secular State.

5. INDIAN POLITY

- i. Constitution of India–Preamble to the Constitution–Salient features of the Constitution–Union, State and Union Territory.
- ii. Citizenship, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy.
- iii. Union Executive, Union Legislature–State Executive, State Legislature–Local Governments, Panchayat Raj.
- iv. Spirit of Federalism: Centre-State Relationships.
- v. Election–Judiciary in India–Rule of Law.
- vi. Corruption in public life – Anti-Corruption measures – Lokpal and Lokayukta – Right to Information – Empowerment of Women – Consumer Protection Forums – Human Rights Charter.

6. INDIAN ECONOMY

- i. Nature of Indian economy–Five year plan models – an assessment – Planning Commission and NITI Aayog.
- ii. Sources of revenue–Reserve Bank of India – Finance Commission–Resource sharing between Union and State Governments –Goods and Services Tax.
- iii. Economic Trends – Employment Generation, Land Reforms and Agriculture – Application of Science and Technology in Agriculture – Industrial growth – Rural Welfare oriented programmes – Social Problems –Population, Education, Health, Employment, Poverty.

7. INDIAN NATIONAL MOVEMENT

- i. National Renaissance –Early uprising against British Rule–Indian National Congress – Emergence of Leaders –B.R.Ambedkar, Bhagat Singh, Bharathiar, V.O.Chidambaranar, ThanthaiPeriyar, Jawaharlal Nehru, Rabindranath Tagore, Kamarajar, Mahatma Gandhi, MaulanaAbulKalam Azad, Rajaji, Subhash Chandra Bose, MuthulaksmiAmmaiyar, MuvalurRamamirtham and other National Leaders.
- ii. Different modes of Agitation of Tamil Nadu and movements.

8. HISTORY, CULTURE,HERITAGEANDSOCIO-POLITICAL MOVEMENTS OF TAMIL NADU

- i. History of Tamil Society, related Archaeological Discoveries, Tamil Literature from Sangam age till contemporary times.
- ii. **Thirukkural:**
 - a) Significance as a Secular Literature.
 - b) Relevance to Everyday Life.
 - c) Impact of Thirukkural on Humanity.
 - d) Thirukkural and Universal Values – Equality, Humanism etc.
 - e) Relevance to Socio – Politico –Economic affairs.
 - f) Philosophical content in Thirukkural.
- iii. Role of Tamil Nadu in freedom struggle – Early agitations against British Rule – Role of women in freedom struggle.
- iv. Various Social reformers,Social reform movements and Social transformation of Tamil Nadu.

9. DEVELOPMENT ADMINISTRATION IN TAMIL NADU

- i. Social Justice and Social Harmony as the Cornerstones of Socio-Economic Development.
- ii. Education and Health systems in Tamil Nadu.
- iii. Geography of Tamil Nadu and its impact on Economic growth.

10. APTITUDE & MENTAL ABILITY TESTS

- i. Simplification–Percentage–Highest Common Factor(HCF)– Lowest Common Multiple(LCM).
- ii. Ratio and Proportion.
- iii. Simple Interest– Compound Interest–Area–Volume–Time and Work.
- iv. Logical Reasoning – Puzzles – Dice–Visual Reasoning–Alpha Numeric Reasoning– Number Series.