

8. SCHEME OF EXAMINATION: OBJECTIVE TYPE (OMR METHOD) AND ORAL TEST :-

Subject	Duration	Maximum Marks	Minimum Qualifying Marks for selection	
			SCs,SC(A)s,STs, MBCs/DCs, BC(OBCM)s and BCMs	Others
<u>i. Paper- I (Subject Paper)</u> (PG Degree Standard) (200 Questions) i. Forensic Science (Code No.226) ii. Biology (Code No.227) iii. Chemistry (Code No.228) iv. Physics (Code No.229) v. Computer Science (Code No.287)	3 hours	300	171	228
<u>ii. Paper - II (General Studies)</u> (100 Questions) (Code No.003) General Studies (Degree Standard) - 75 Questions AND Aptitude and Mental Ability (SSLC Standard) - 25 Questions	2 hours	200		
<u>iii. Interview and Records</u>	---	70		
	Total	570		

Note

- (i) The Candidates who have obtained PG degree in Forensic science should appear in the subject Forensic Science in Paper-I.
- (ii) The candidates who have obtained their PG degree in the subject as shown in column (4) of the **Explanation** in the para 6(b) of the Notification should appear only in the subject under which it is grouped as shown in column (2), except P.G. Degree in Computer Science who should appear only in the subject Computer Science in Paper-I.
- (iii) The Syllabi for Examination is furnished in the **Annexure - II** of the Notification and also available in the Commission's website www.tnpsc.gov.in
- (iv) **The questions for the subjects Forensic Science, Biology and Computer Science in Paper - I will be set in English only** and questions for the subjects Physics and Chemistry in Paper - I will be set both in English and Tamil. The questions for Paper-II will be set both in English and Tamil.

PAPER-I
SYLLABUS
PHYSICS (PG DEGREE STANDARD)

Code No.229

1. UNIT-I MECHANICS – RELATIVITY AND SPACE PHYSICS:-

Impulse – Impact – Laws of Impact – Direct impact and Oblique impact between two smooth Spheres – Loss of Kinetic theory – Motion of two interacting bodies – Reduced mass – Rigid body dynamics

RELATIVITY: Postulates of Special Theory of relativity – Lorentz transformation Equations and its Consequences – Relativity of Simultaneity - Mass Energy Equivalence

SPACE PHYSICS: Escape Velocity – Orbital Velocity – Geo Stationary Orbits and Satellite Communication – Remote Sensing.

2. UNIT-II CLASSICAL MECHANICS:-

Generalised Co-ordinates – D'Alembert's Principle - Lagrangian Equations and its applications – Hamilton's Equations from Variation Principle – Principle of Least Action – Canonical Transformations and its applications – Hamilton – Jacobi Theory – Action Angle Variable – Kepler's Problem – Theory of Small Oscillations – Eulerian Angles, Euler's Theorem – Coriolis force – Euler Equations of motion.

3. UNIT-III THERMODYNAMICS – STATISTICAL MECHANICS:-

Laws of thermodynamics – Entropy – Thermodynamic potentials – Maxwell's equations and its applications Gibbs phase rule – Phase transition – Vanderwaal's equation of State.

CLASSICAL STATISTICS: Micro and Macro States – Liouville's theorem – Micro Canonical and grand Canonical ensembles – partition function Gibbs Paradox.

QUANTUM STATISTICS: Maxwell's distribution – BE Statistics – Black body radiation – Planck's Radiation Law – FD Statistics – Applications

4. UNIT- IV OPTICS – ATOMIC AND MOLECULAR SPECTROSCOPY:-

Basic ideas of Interference, Diffraction and Polarisation – Principle of LASER and its applications – Coupling Schemes – Zeeman effect – Paschen – Back effect – Spectra Structure of atomic molecules – Rotation, Vibration and Rotation – Vibration Spectra Frank – Condon principle – Microwave, IR, RAMAN, Mossbauer, NMR, NQR and ESR Spectroscopy – Principle, technique and applications.

5. UNIT-V SOLID STATE AND NUCLEAR PHYSICS:-

Crystal Classes and Systems – 2D, 3D Lattices – Lattice heat capacity X-rays – X-ray diffraction – Uses – Band theory of Solids – Fermi level – Superconductivity – Basic concepts – application of Super Conductors. Different types of magnetic materials.

Nucleus – Properties and Structure – Nuclear forces – Binding energy – Radioactive decays – Particle detectors and accelerators – Nuclear fission and fusion – Elementary particles – Cosmic Rays.

6. UNIT-VI QUANTUM MECHANICS:-

Basic formalism – Schroedinger time dependent and time independent equations – eigen values and eigen functions – uncertainty principle – Hilbert space - Dirac notation – Schroedinger and Heisenberg interaction picture – WKB Quantisation rule – Time dependent perturbation theory – Fermi golden rule – Born and Sudden approximations – Dirac's relativistic equation – Dirac's equation for a central field – Spin angular momentum – negative energy states.

7. UNIT-VII ELECTRO MAGNETIC THEORY:-

Gauss Law – Laplace and Poisson equations – Biot and Savart Law – Ampere Law – Faraday's Laws of induction – Maxwell's Equations – Molecular Polarisability and electrical susceptibility – Lorentz force – Equation of Continuity – Propagation of EM Waves in non conducting and conducting medium – reflection and refraction at a plane interface between dielectrics – Radiation from a localised source – oscillating electric dipole.

8. UNIT-VIII ELECTRONIC DEVICES AND APPLICATIONS:-

Semi Conductor diode and Transistor – Optoelectronic devices – photo diode, photo transistor, LDR, LED, LCD, Special Semi conductor devices – JFET, MOSFET, UJT, SCR – Characteristics and applications – Operational amplifier Characteristics and applications – 555 timer – Block diagram and working.

Electrodes and transducers used in ECG and EEG techniques – ultrasound Scan – Basic ideas of CT and MRI Scan.

9. UNIT-IX DIGITAL ELECTRONICS AND MICROPROCESSOR:-

Logic gates – half and full adder and subtractors – Parellel binary adder – 8421 adder – karnaugh map –NAND – NOR networks – flipflops – counters and shift registers - Architecture of 8085 – Addressing models – Instruction set – Programming techniques – Semiconductor memory types – RAMS and ROMS – Interfacing of memory devices and I/o Ports.

10. UNIT- X COMMUNICATION ELECTRONICS:-

Directional high frequency antennas – Sky wave propagation – Ground wave propagation – Modulation and demodulation techniques – Principle of radio communication – AM and FM transmission – RADAR Principle and equation – Television transmission and reception – Fibre optics – Propagation of Light in an Optical fibre – Losses and dispersion – applications

PAPER-I
SYLLABUS

COMPUTER SCIENCE (PG DEGREE STANDARD)

SUBJECT CODE: 287

UNIT - I: MATHEMATICAL FOUNDATIONS

AUTOMATA, LANGUAGES AND COMPUTATION Basic concepts of strings, alphabets, languages, finite automaton, regular expressions, Moore and Mealy machines, regular sets, minimization of finite automata, Chomsky hierarchy of languages, relation between classes of languages, context free grammar, pushdown automata, Linear bounded automata, Turing machines, halting problem and decidability.

DESIGN AND ANALYSIS OF ALGORITHMS Design Techniques, divide and conquer, greedy method, dynamic programming etc., graph algorithms, Strassen's matrix multiplication algorithm, geometric algorithms, NP complete problems, approximation algorithms.

UNIT - II: COMPUTER ARCHITECTURE

Review of elements of Computer organisation - Machine instructions, addressing modes, instruction pipelining, memory organization. CPU and system buses, bus standards, Von Neumann Vs Non Von Neumann architectures, language directed architectures, RISC architectures, object oriented architectures, memory and I/O subsystems - Hierarchical memory, virtual memory system memory allocation and management, cache memories, I/O subsystems, architectural classification, pipelined processors, vector processing. Array processors, multiprocessor architectures.

UNIT - III: DATA STRUCTURES IN C++

Data types, control statements, procedures, Scope rules, arrays and records, enumerated data types, sets, pointers, recursion. Sequential, indexed files, sorting and merging report generations. Arrays, queues, linked lists, stacks, tree traversal, evaluation of expressions using postfix notation, sorting algorithms, bubble sort, quick sort, heap sort, complexity of algorithms.

UNIT - IV: COMPILERS AND ADVANCED OPERATING SYSTEMS

Assemblers loaders, linkers, macro processor, text editors, programming languages, lexical analysis, parsing techniques, precedence grammars, symbol tables, scope rules and parameter passing mechanisms, syntax directed translation, run time environment, machine code generation, interpreter.

ADVANCED OPERATING SYSTEMS

(a) **Review of uniprocessor operating system:** Batch, multiprogramming and time-sharing systems, operating system concepts, memory, device and file management, process scheduling, interprocess communication, process synchronization and concurrency, deadlocks, protection.

(b) **Multiprocessor operating system:** Classification of multiprocessor operating systems, software and operating system requirements for multiprocessors, multiprocessor scheduling strategies. (c) **Distributed Operating System:** Communication in distributed systems, client server model, remote procedure call, group communication, synchronization in distributed systems, mutual exclusion and election algorithms, deadlocks in distributed systems, processor allocation algorithms, scheduling in distributed system, distributed file systems.

UNIT - V: DATABASE MANAGEMENT SYSTEMS

Elements of data base systems, file organization, relational and network data models, normal forms, query languages. Design and implementation of typical database systems, Internal and external consistency, concurrency control techniques, object oriented data bases.

UNIT - VI: MOBILE COMMUNICATIONS

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies. WIRELESS APPLICATION PROTOCOL [WAP] – Architecture – XML – WML Script – Applications.

UNIT - VII: SOFTWARE PROJECT MANAGEMENT

Software Project Planning: Size Estimation - Cost Estimation Models - The Constructive Cost Model (COCOMO)-COCOMO II - The Putnam Resource Allocation Models -Software Risk Managements.

UNIT - VIII: MULTIMEDIA AND WEB TECHNOLOGIES

Uses of Multimedia – Introduction to making multimedia – Multimedia skills. Multimedia hardware and software – Connections – Memory and storage devices – Input devices – Output devices – Communication devices. Basic software tools – Text editing and word processing tools – Painting and drawing tools – 3-D modelling and animation tools – Image editing tools – Animation, video and digital movie tools. Making instant multimedia – Multimedia authoring tools. Multimedia Building Blocks – Text – Sound – Multimedia System Sounds – MIDI versus Digital Audio – Digital Audio – Making MIDI Audio – Audio File Formats – Production tips - Images – Animation - Video.

The world wide web: Browsing the Web - Web address - Web browser basics - Strong and managing(book marks) - Surfing the web with web browser - Searching the web directory - Search engines - Navigation tools.

Email: Sending - Reading - Replying - Deleting - Exiting - Sending Mail to more than one person sending folder - Forwarding a mail - Checking the spelling - Attachments.

HTML: Overview of HTML - Adding structure to a page formatting text and pages - Linking page to the world - Including picture - Clearing lists - Arranging items within tables - Getting feedback from form - Splitting a page into frames.

UNIT - IX: OBJECT ORIENTED ANALYSIS AND DESIGN

Unified Modeling Language [UML] - Diagrams - Class - Use case - Naming Classes - Identifying Objects, Relationships, Attributes, Methods - Association - Super and Sub Class Relationship - Aggregation.

UNIT - X: ADVANCED TOPICS: ARTIFICIAL INTELLIGENCE, CLOUD COMPUTING, CYBER SECURITY

Artificial Intelligence: Production systems, different strategies, hill climbing, backtracking, graph search specialised production systems, minimax procedure, alphabeta pruning, resolution and refutation, control strategies, structured representation of knowledge, semantic nets, frames.

Cloud Computing: Architecture - Deployment Models - Application Virtualization - Hardware Virtualization.

Network Security: Potential Attacks to Computer System – Cryptography – Authentication – Access Control – Digital Signatures.

PAPER- II
SYALLBUS
GENERAL STUDIES (DEGREE STANDARD)

UNIT- I: GENERAL SCIENCE

Physics Universe-General Scientific laws-Scientific instruments-Inventions and Discoveries - National scientific laboratories-Science glossary - Mechanics and properties of matter-Physical quantities, standards and units-Force, motion and energy-Electricity and Magnetism, Electronics and Communication -Heat, light and sound-Atomic and nuclear physics-Solid State Physics – Spectroscopy- Geophysics - Astronomy and space science.

Chemistry Elements and Compounds-Acids, bases and salts-Oxidation and reduction- Chemistry of ores and metals-Carbon, nitrogen and their compounds-Fertilizers, pesticides, insecticides-Biochemistry and biotechnology-Electrochemistry-Polymers and plastics.

Botany Main Concepts of life science-The cell-basic unit of life-Classification of living Organism -Nutrition and dietetics-Respiration-Excretion of metabolic waste- Bio-communication.

Zoology Blood and blood circulation-Endocrine system-Reproductive system-Genetics the science of heredity-Environment, ecology, health and hygiene, Bio- diversity and its conservation-Human diseases-Communicable diseases and non- communicable diseases- prevention and remedies- Alcoholism and drug abuse-Animals, plants and human life.

UNIT- II: CURRENT EVENTS

History Latest diary of events – National--National symbols-Profile of States-Defence, national security and terrorism-World organizations-pacts and summits-Eminent persons & places in news-Sports & games-Books & authors -Awards & honours-Cultural panorama-Latest historical events - India and its neighbours-- Latest terminology- Appointments-who is who?

Political Science 1.India's foreign policy-2. Latest court verdicts – public opinion-3. Problems in conduct of public elections - 4. Political parties and political system in India- 5. Public awareness & General administration- 6. Role of Voluntary organizations & Government.,- 7. Welfare oriented Government schemes, their utility.

Geography Geographical landmarks-Policy on environment and ecology.

Economics Current socio-economic problems-New economic policy & govt. Sector.

Science Latest inventions on science & technology-Latest discoveries in Health Science- Mass media & communication.

UNIT-III: GEOGRAPHY

Earth and Universe-Solar system - Atmosphere hydrosphere, lithosphere- Monsoon, rainfall, weather and climate-Water resources - rivers in India- Soil, minerals & natural resources-Natural vegetation-Forest & wildlife - Agricultural pattern, livestock & fisheries-Transport including Surface transport & communication - Social geography – population density and distribution-Natural calamities – disaster management-Climate change - impact and consequences - mitigation measures-Pollution Control.

UNIT-IV: HISTORY AND CULTURE OF INDIA

Pre-historic events - Indus valley civilization-Vedic, Aryan and Sangam age- Maurya dynasty-Buddhism and Jainism-Guptas, Delhi Sultans, Mughals and Marathas-Age of Vijayanagaram and the bahmanis-South Indian history-Culture and Heritage of Tamil People - Advent of European invasion-Expansion and consolidation of British rule-Effect of British rule on socio-economic factors-Social reforms and religious movements-India since independence-Characteristics of Indian culture-Unity in diversity –race, colour, language, custom-India-as secular state-Organizations for fine arts, dance, drama, music- Growth of rationalist, Dravidian movement in TN-Political parties and populist schemes- Prominent personalities in the various spheres – Arts, Science, literature and Philosophy – Mother Teresa, Swami Vivekananda, Pandit Ravishankar , M.S.Subbulakshmi, Rukmani Arundel and J.Krishnamoorthy etc.

Unit-V: INDIAN POLITY

Constitution of India-. Preamble to the constitution- Salient features of constitution- Union, State and territory- Citizenship-rights amend duties- Fundamental rights- Fundamental duties- Human rights charter- Union legislature – Parliament- State executive- State Legislature - Assembly- Status of Jammu & Kashmir- Local government – Panchayat raj – Tamil Nadu - Judiciary in India – Rule of law/Due process of law- Indian federalism – Centre – state relations- Emergency provisions- Civil services in India- Administrative challenges in a welfare state- Complexities of district administration- Elections - Election Commission Union and State. Official language and Schedule-VIII- Amendments to constitution- Schedules to constitution-. Administrative reforms & tribunals- Corruption in public life- Anti-corruption measures – Central Vigilance Commission, lok-adalats, Ombudsman, - Comptroller and Auditor General of India- Right to information - Central and State Commission- Empowerment of women- Voluntary organizations and public grievances redressal- Consumer protection forums.

UNIT-VI: INDIAN ECONOMY

Nature of Indian economy-Need for economic planning-Five-year plan models-an assessment - Land reforms & agriculture-Application of science in agriculture- Industrial growth - Capital formation and investment-Role of public sector & disinvestment- Development of infrastructure - National income- Public finance & fiscal policy- Price policy & public distribution- Banking, money & monetary policy- Role of Foreign Direct Investment (FDI) - WTO-globalization & privatization - Rural welfare oriented Programmes - Social sector problems – population, education, health, employment, poverty-HRD - sustainable economic growth- Economic trends in Tamil Nadu -Energy Different sources and development- Finance Commission -Planning Commission- National Development Council.

UNIT-VII: INDIAN NATIONAL MOVEMENT

National Renaissance-Early uprising against British rule-1857 Revolt- Indian National Congress-Emergence of national leaders-Gandhi, Nehru, Tagore, Nethaji - Growth of militant movements -Different modes of agitations-Era of different Acts & Pacts-World war & final phase struggle-Communalism led to partition-Role of Tamil Nadu in freedom struggle - Rajaji, VOC, Periyar, Bharathiar & Others-Birth of political parties /political system in India since independence.

Unit-VIII: APTITUDE & MENTAL ABILITY TESTS (SSLC Standard)

Conversion of information to data - Collection, compilation and presentation of data - Tables, graphs, diagrams-Parametric representation of data - Analytical interpretation of data - Simplification - Percentage - Highest Common Factor (HCF) - Lowest Common Multiple (LCM) - Ratio and Proportion-Simple interest-Compound interest- Area - Volume - Time and Work - Behavioural ability - Basic terms, Communications in information Technology - Application of Information and Communication Technology (ICT) - Decision making and problem solving-Logical Reasoning-Puzzles - Dice-Visual Reasoning-Alpha numeric Reasoning-Number Series - Logical Number/Alphabetical/Diagrammatic Sequences.
