

Syllabus for the post of Assistant Registrar

1. **Aptitude-** Averages, Number System, Profit and Loss, Time and Work, Problems on Trains, Compound Interest, Decimal Fractions, Calendar, Area, Problems on Numbers, Square Root and Cube Root, Boats and Streams, Probability, Interest, Percentage, Ratio, Time And Distance, Problems on Ages, Partnership, Clock, Simplifications, Volume and Surface, Problems on H.C.F And L.C.M, Logarithm, Chain Rule, Pipes and Cistern, Odd Man Out and Series, Height and Distance etc.
2. **Reasoning-** Number Series Compilation, Missing Number Finding, Continuous Pattern Series, Direction Sense Test, Puzzle, Verbal Classification, Matching Definitions, Logical Deduction, Series Compilations, Classification, Missing Character Finding, Odd Man Out, Blood Relations, Analogy, Coding And Decoding, Truth Verification Of The Statement, Syllogisms, Analogies, Verbal Reasoning, Statement And Conclusions, Letter And Symbol Series, Logical Problems, Logical Sequence Of Words, Arithmetic Reasoning, Data Sufficiency etc.
3. **General English-** Antonyms, Synonyms, Spelling Check, Change of Voice, Spotting Errors, Sentence Improvement, One Word Substitute, Selecting Words, Sentence Corrections, Idioms and Phrases, Communication Skills, Common Error Detection, Sentence Compilation, Ordering of Words, Ordering of Sentences, Verbal Analogies, Sentence Formation, Completing Statements, Change of Speech etc.
4. **GK-** Indian History, Indian Economy, Indian Culture, Environmental Science, Awards And Honors, Famous Places In India, World Organization, Sports, Books And Authors, Famous Personalities, Days And Years, World Geography, Basic General Knowledge, Physics, Biology, Indian Politics, Indian Geography, General Science, Chemistry, Technology, Inventions, Current Affairs etc.
5. **Computer Fundamentals-** Computer Fundamentals: Includes questions on Operating System, MS Office, MS Word, MS Excel, Power Point, Internet, E-mail, Antivirus and various online tools used in day to-day office work etc.
6. **Domain Knowledge:**

Service Rules

FR & SR, LTC Rules, Leave Rules, CCS Conduct Rules, TA/DA Rules, Medical Attendance Rules, Disciplinary & Vigilance, Office Procedure, Reservation in Service Rules, etc., DPC, Pay Fixation, Seniority, Legal Matters, Foreign Service, Deputation, Service Rules, CCS(Pension) Rules, New Pension Scheme etc.

Financial Matters:

General Financial Rules (GFR), Elementary knowledge of Income Tax, GST Rules, procedures for budgeting, Audit procedure, Role and functions of CAG, Balance Sheet and Trial Balance, Ledgers and postings, Bank, reconciliations Statement, Receipt & Payments, Budgets and Estimation, Knowledge of Tally Software etc.

Public Procurement:

Procurement of Goods and Services, GeM Rules and Procedures, Central Public Procurement Portal: Tendering, Procuring, etc., Contract Management, Inventory Management, Procurement Manuals, Import of Goods etc.

Academic Administration with special reference to NITs.

NITSER Act and Statutes & Recruitment Rules, Role and functions of NIT Council, Board of Governors, Finance Committee, Building and Works Committee, Senate, Departments/Schools/Centres at MANIT Bhopal, Grade point system, CGPA/GPA, Scholarships, Credit system, Regulatory Bodies on Higher Education, Ministry of Education, Basic Concepts of Management (Planning, Organizing, Controlling, Motivation, Works and method study, E-office, digitization process) etc.

Government Acts, Laws relevant to Academic Administration:

The Right to Information Act-2005, Anti Ragging Act, Labour Laws (including Maternity Benefits, Contractual Labour, Outsourcing, ESI/EPF, Gratuity etc.), the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act-2013, Information Technology Act-2000, Companies Act -2013, Indian Contract Act, Income Tax Act with focus on Salary Income, e-TDS, Service Tax Rules, GST Rules etc.

Syllabus for the post of Assistant Librarian

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6. **Domain Knowledge:**

Introduction to Library and Information Science: History, Concepts and principles, Role and functions, Types of libraries, Information Organization and Retrieval - Cataloguing and classification, Metadata standards, Information retrieval techniques, Information Sources and Services, Online databases and digital libraries, Open access and scholarly communication.

Collection Development and Management: Selection policies and criteria, Acquisitions and budgeting, Collection assessment and weeding, Information Sources and Services, Reference services and information literacy, Online databases and digital libraries, Open access and scholarly communication, TQM, MIS.

Information Technology and Systems: Library management systems (LMS), Information storage and retrieval systems, Emerging technologies, Digital Preservation and Archiving, Institutional Repositories, ROAR, DOAR, SHARPA-ROMIO, Content Management, Application of Artificial Intelligence, Expert Systems and Robotics in Libraries, Library Consortiums.

Research Methods in Library and Information Science: Research design and methodologies, Data collection and analysis, Writing research proposals and reports, Information Ethics and Intellectual Property, Copyright and fair use, Privacy and confidentiality Ethical issues in information dissemination.

Bibliometrics, Scientometrics & Webometrics - Measuring Scientific Publications, Citations, hIndex, Impact Factor, Scientometric Indicators, Altmetrics etc. Future Trends and Challenges etc.

Syllabus for the post of Executive Engineer

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6. **Domain Knowledge:**

ELECTRICAL ENGINEERING

Engineering Mathematics: Matrix theory, Eigen values & Eigen vectors system of linear equations, Numerical methods for solution of non linear algebraic equation and differential equations, integral calculus, partial derivatives, maxima and minima, line Surface and Volume Integrals. Flourier series, linear, non linear and partial differential equations, initial and boundary value problems, complex variables, Taylor's and Laurent's series, residue theorem, probability and statistics fundamentals, Sampling theorem, random variables, Normal and Poisson distributions, correlation and regression analysis.

Electrical Materials: Electrical Engineering Materials, crystal structures and defects, ceramic materials, insulating materials, magnetic materials – basics, properties and applications, ferrities, ferro-magnetic materials and components; basic of solid state physics conductors, photo conductivity, Basic of Nano metrials and Super conductors.

Electric Circuits and Fields: Circuit elements, network graph, KCL, KVL, Node and Mesh analysis, ideal current and voltage sources, Thevenin's, Norton's, Superposition and Maximum Power Transfer theorems, transient response of DC and AC networks, Sinusoidal steady state analysis, basic filter concepts, two port networks, three phase circuits, Magnetically coupled circuits, Gauss Theorem, electric field and potential due to point, line, plane and spherical charge distribution, Ampere's and Biot-Savart's laws; inductance, dielectrics, capacitance, Maxwell's equations.

Electrical and Electronic Measurement: Principles of measurement, accuracy precision and standards; Bridges and potentiometers; moving coll, moving iron, dynamometer and induction type instruments, measurement of voltage, current, power, energy and power factor, instrument transformers, digital voltmeters and multi meters, phase, time and frequency measurement, Q-meters, oscilloscopes, potentiometric recorders, error analysis, Basic of sensors, Transducers, basic of acquisition systems.

Computer Fundamentals: Number systems, Boolean algebra, arithmetic functions, Basic Architecture, Central Processing Unit, I/O and Memory Organisation peripheral devices, data representation and programming basics of Operating system and networking, virtual memory, file systems. Elements of programming languages, typical examples.

Basic Electronics Engineering: Basics of Semiconductor diodes and transistors and characteristics, junction and field effect transistors (BJT, FET and MOSFETS), different types of transistor amplifiers, equivalent circuits and frequency response, oscillators and other circuits, feedback amplifiers.

Analog and Digital Electronics: Operational amplifiers – characteristics and applications combinational and sequential logic circuits, multiplexers, multi vibrators, samples and hold circuits, A/D and D/A converters, basic of filter circuits and applications, simple active filters; Microprocessor basics – interfaces and applications, basics of linear integrated circuits ; Analog communication basics; Modulation and demodulation, noise and bandwidth, transmitters and receivers, signal to noise ratio, digital communication basics, sampling, quantizing, coding, frequency and time domain multiplexing, power line carrier communication systems.

Systems and Signal Processing: Representation of continuous and discrete-time signals, shifting and scaling operations, linear, time-invariant and casual systems, Fourier series representation of continuous periodic signals, sampling theorem, Fourier and Laplace transforms, Z transforms, Discrete Fourier transform, FFT, linear convolution, discrete cosine transform, FIR filter, IIR filter bilinear transformation.

Control Systems: Principles of feedback, transfer function, block diagrams and signal flow graphs, steady state errors, transforms and their applications, Routh hurwitz criterion, Nyquist techniques, Bode plots, root loci, lag, lead and lead lag compensation, stability analysis, transient and frequency response analysis, state space model, state transition matrix controllability and observability, linear state variable feedback, PID and industrial controllers.

Electrical Machines: Single phase transformers, three phase transformers – connections, parallel operation, auto transformer, energy conversion principles, DC machines – types, winding, generator characteristics, armature reaction and commutation, starting and speed control of motors, induction motors – principles, types, performance characteristics starting and speed control, Synchronous machines – performance regulation, parallel operation and generators, motor starting characteristics and applications, servo and stepper motors.

Power Systems : Basic power generation concepts, steam, gas and water turbines, transmission line models and performance, cable performance, insulation, corona and radio interference, power factor correction, symmetrical components, fault analysis, principles of protection systems, basics of solid state relays and digital protection, circuits breakers, Radial and ring main distribution systems, Matrix representation of power systems, load flow analysis, voltage control and economic operation, system stability concepts, Swing curves and equal area criterion. HVDC transmission and FACTS concepts of power system dynamics, distributed generation, solar and wind power, smart grid concepts, environmental implications, fundamentals of power economics.

Power Electronics and Drives : Semiconductor power diodes, transistors, thyristors, triacs, GTOs, MOSFETs and IGBTs – static characteristics and principles of operations triggering circuits, phase control rectifiers, bridge converters - fully controlled and half controlled, principles of choppers and inverters, basis concepts of adjustable speed DC and 3 AC drives, DC-DC switched mode converters, DC-AC switched mode converters, resonant converters, high frequency inductors and transformers, power supplies etc.

CIVIL ENGINEERING

Building Material: Stone, Lime, Glass, Plastics, Steel, FRP, Ceramics, Aluminium, Fly Ash, Basic Admixture, Timber, Bricks and Aggregates; Classification, properties and selection criteria; Cement : Types, Composition, Properties, Uses, Specifications and various Tests; Lime & Cement Mortars and

Concrete; Properties and various Tests; Design of Concrete Mixes ; Proportioning of aggregates and methods of mix design.

Solid Mechanics : Elastic constants; Stress, plane stress, strains, plane strain, Mohr's circle of stress and strain, Elastic theories of failure, Principal stresses, Bending, shear and Torsion.

Structural Analysis : Basics of strength of materials, Types of stresses and strains, Bending moments and shear force, concept of bending and shear stresses; Analysis of determinate and indeterminate structures; Trusses, beams, plane frames; Rolling loads, influence Lines, Unit load method & other methods; Free and Forced vibration of single degree and multi degree freedom system, Suspended Cables; Concepts and use of Computer Aided Design.

Design of Steel Structures: Principles of Working stress methods, Design of tension and compression members, Design of beams and beam column connections, built-up sections, Girders, industrial roofs, Principles of Ultimate load design.

Design of Concrete and Masonry Structure: Limit state design for bending, shear, axial compression and combined forces; Design of beams, slabs, Lintels, Foundations, Retaining walls, Tanks, Staircase; Principles of pre-stressed concrete design including materials and methods; Earthquake resistant design of structures; Design of Masonry Structure.

Construction Practice, Planning and Management: Construction – Planning, Equipment, Site investigation and Management including Estimation with latest project management tools and network analysis for different Types of works, Analysis of rates of various types of work Tendering Process and Contract Management, Quality Control, Productivity, Operation Cost; Land acquisition, Labour safety and welfare.

Flow of Fluids, Hydraulic Machines and Hydro Power:

- (a) Fluid Mechanics, Open Channel Flow, Pipe Flow: Fluid properties, Dimensional Analysis and Modeling; Fluid dynamics including flow kinematics and measurements; Flow net; Viscosity, Boundary layer and control, Drag, Lift, Principles in open channel flow, Flow controls. Hydraulic jump; Surges; Pipe network;
- (b) Hydraulic Machines and Hydro Power: Various pumps, Air vessels, Hydraulic turbines – types, classifications & performance parameters; Power house – classification and layout, storage pondage, control of supply.

Hydrology and water resources Engineering: Hydrological cycle, Ground water hydrology, Well hydrology and related data analysis; Streams and their gauging; River morphology; Flood, drought and their management; Capacity of Reservoirs. Water Resources Engineering : Multipurpose uses of Water, River basins and their potential, irrigation systems, water demand assessment, Resources – storage and their yields; Water logging, canal and drainage design, Gravity dams, falls, weirs, Energy dissipaters barrage Distribution works, Cross drainage works and head works and their design; Concepts in canal design, construction & maintenance; River training measurement and analysis of rainfall.

Environmental Engineering:

Water Supply Engineering: Sources, Estimation, quality standards and testing of water and their treatment, Rural Institutional and industrial water supply, Physical, chemical and biological characteristics and sources of water, pollutants in water and its effects, Estimation of water demand, Drinking water standards, Water Treatment Plants, Water distribution network.

Waste Water Engineering: Planning & design of domestic waste water, sewage collection and disposal; plumbing Systems. Components and layout of sewerage system; Planning & design of Domestic Waste water disposal system; sludge management including treatment, disposal and re-use of treated effluents; industrial waste waters and Effluent Treatment Plants including institutional and industrial sewage management.

Solid Waste Management: Sources & Classification of solid wastes along with planning & design of its management system; Disposal system, Beneficial aspects of wastes and Utilization by Civil Engineers.

Air, Noise, Pollution and Ecology: Concepts & general methodology.

Geo-technical Engineering and Foundation Engineering:

Geo-technical Engineering: Soil exploration – planning & methods, Properties of soil, classification, various tests and inter relationships; Permeability & Seepage, Compressibility, consolidation and shearing resistance, Earth pressure theories and stress distribution in soil; properties and uses of geosynthetics.

Foundation Engineering: Types of foundations & selection criteria, bearing capacity, settlement analysis, design and testing of shallow & deep foundations, Slope stability analysis, Earthen embankments, Dams and Earth retaining structures; types, analysis and design, Principles of ground modifications.

Surveying and Geology: (a) Surveying: Classification of surveys, various methodologies, instruments & analysis of measurement of distances, elevation and directions, Field astronomy, global Positioning System; Map preparation; Photogrammetry; Remote sensing concepts; Survey Layout for culverts, canals, bridges, road / railway alignment and building, setting out of curves. (b) Geology: Basic knowledge of Engineering geology & its application in projects.

Transportation Engineering: Highway: Planning & construction methodology, Alignment and geometric design; Traffic Surveys and Controls, Principles of Flexible and Rigid pavements design. Tunneling : Alignment, methods of construction, disposal of muck, drainage, lighting and ventilation. Railway Systems: Terminology, Planning, design and maintenance practices; track modernization Harbours: Terminology, layouts and planning Airports: Layout, Planning and design etc.

Syllabus for the post of SAS Officer

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3. **General English-** Antonyms, Synonyms, Spelling Check, Change of Voice, Spotting Errors, Sentence Improvement, One Word Substitute, Selecting Words, Sentence Corrections, Idioms and Phrases, Communication Skills, Common Error Detection, Sentence Compilation, Ordering of Words, Ordering of Sentences, Verbal Analogies, Sentence Formation, Completing Statements, Change of Speech etc.
4. **GK-** Indian History, Indian Economy, Indian Culture, Environmental Science, Awards And Honors, Famous Places In India, World Organization, Sports, Books And Authors, Famous Personalities, Days And Years, World Geography, Basic General Knowledge, Physics, Biology, Indian Politics, Indian Geography, General Science, Chemistry, Technology, Inventions, Current Affairs etc.
5. **Computer Fundamentals-** Computer Fundamentals: Includes questions on Operating System, MS Office, MS Word, MS Excel, Power Point, Internet, E-mail, Antivirus and various online tools used in day to-day office work etc.
6. **Domain Knowledge:**

Physical Education - Meaning, Definition, Aims, Objectives and Scope. History of Physical Education in Ancient Greece: in Reference to Sparta and Athens. Philosophy: Meaning, functions of Philosophy, Idealism, Realism, Naturalism, Pragmatism, Arjuna Award, Dronacharya Award /MAKA Trophy. Ancient and Modern Olympic Game, Commonwealth Games.

Sports Kinesiology - Meaning of kinesiology, aims and objectives of kinesiology. Importance of kinesiology in physical education. Meaning structure and chemical composition of bones. Functions and types of bones. Common postural deformities i.e. flat foot, bow legs, knock knees, lordosis, scoliosis, kyphosis, and round shoulders, their causes and remedial measures. Motion and types of motion & Newton's law of motion.

Test, Measurement, & Evaluation - Meaning and Definition of Test, Measurement, & Evaluation. Philip's J.C.R Test, AAHPER Youth Fitness Test, Tuttle Pulse Ratio Test, Harvard Step Test) Hicks Badminton Test, Knox Basketball Test, McDonald Soccer Test, Henry- Friedel field Hockey Test, Russell-Lange Volleyball Test. Somatotyping Meaning of Somatotyping Brief Account of Kretchmer's Body Type, Brief Account of Sheldon Body Classification.

Sports Training - Meaning and Definition of Sports Training, Aims and Objectives of Sports Training. Meaning and Types, Talent Identification and its Importance. Meaning of Training Load, Principle of Training Load, Overload Causes and Symptoms of Overload. Definition and Meaning of Strength, Types of Endurance, Factor Affecting Speed, Methods of Developing Endurance Definition Meaning of Flexibility, Types of coordinative ability, Factor Affecting Flexibility, Methods of Developing Flexibility.

Muscular System: Classification of Muscles, Functions and Types of Muscles, Concept of Homeostasis and its Relevance to Physical Education and Sports, Brief Introduction of the Cardiovascular System: The Heart & its Structure and Function, Cardiac Cycle, Mechanism of Blood Circulation, Composition and Function of Blood, Brief Introduction of the Respiratory System, Structure and Functions, Mechanism of Respiration, Types of Respiration.

Sports Psychology - Nature, Scope and Importance in Physical Education Methods of Sports Psychology. Concept of Learning, Theories and Laws of Learning. Laws and principles of learning. Meaning and Types Dynamics of Motivation in Sports. Techniques of Motivation. Intelligence, Definition and Meaning of Intelligence Theories of Intelligence Role of Intelligence in Sports.

Officiating - Definition, Meaning and Importance of Officiating, Principles of Officiating, Qualities of good Officials. Duties of Officials: - Pre-game, During Game, Post Game, Measures for Improving the Standard of Officials. Rules of Different games and Dimensions of Play fields. Methods of Conditioning and Training, Continuous Training Method, Interval Training Method, Repetition Training Method etc.

Syllabus for the post of Medical Officer

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6. **Domain Knowledge:**
pathology, surgery, general medicines, pediatrics, anatomy, pathology, O & G medicine, physiology, ophthalmology, biochemistry, microbiology, pharmacology, orthopaedics, preventive & community medicine, surgery and others.

Syllabus for the post of Technical Officer

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Basic Computer Fundamentals: Programming in C and JAVA - sequence, selection and repetition statements, Recursion, Arrays, Problems involving arrays - Error identification – debugging.

Data Structures – Stacks, Queues, Linked Lists, Trees, Binary Search Trees, Binary Heaps, Graphs.

Operating Systems – Processes, Threads, Inter-Process Communication, Concurrency and Synchronization, Deadlock, CPU Scheduling, Memory Management and Virtual Memory, File Systems.

File Management: File organization: blocking and buffering, file descriptor, directory structure. File and Directory structures, blocks and fragments, directory tree, inodes, file descriptors, UNIX file structure. Concept of I/O management.

Microprocessor Operations:- Instruction Cycle, Data fetch, Address Decoding, Classification of Interrupts, Input Output Techniques, Device Controllers(DMA controller , Disk drive controller) Computer Memory and Memory Management Techniques: Types and characteristics, Classification Of memory devices.

Databases – E-R Model, Relational Model: Relational Algebra, Tuple Calculus, SQL, Integrity Constraints, Normal Forms, File Organization, Indexing: B and B++ Trees, Transactions and Concurrency Control.

System maintenance and troubleshooting – Windows and Linux OS installation procedures - Dual boot – Reserving space for User/ System while installing OS – Trouble shooting issues related to OS, device drivers – Installing packages through apt- get install – using GUI.

Computer Networks – Creating LAN using switches – Understanding switching tables - Networking commands – ping, netconfig, IP lookup, traceroute – IP settings – DHCP – DNS - Wi- Fi settings – Wired LAN – Wireless LAN – Access points, Concepts of Layering, Flow and Error Control

Techniques, Switching, IPv4/IPv6, Routers and Routing Algorithms: Distance Vector and Link State, TCP/UDP and Sockets, Congestion Control, Application Layer Protocols: SMTP, POP, FTP, HTTP.

Network Security: Authentication, Basics of Cryptography, Digital Signatures and Certificates, Firewalls, Basic Concepts of Client Server Programming, Cryptography, Digital Signatures and Certificates, Firewalls, Basic Concepts of Client Server Programming.

Practical Networking: Explain the role and function of network components: Routers, L2 and L3 switches, Next-generation firewalls and IPS, Access points, Controllers, Endpoints, Servers, Describe characteristics of network topology architectures 2 tier, 3 tier, WAN, Small office/home office (SOHO) and cloud, Compare physical interface and cabling types, Single-mode fiber, multimode fiber, copper, Connections (Ethernet shared media and point-to-point), Concepts of PoE.

Website design and MIS – Website Design principles, database connectivity – applications involving HTML, CSS, JavaScript, .NET, Decision Making & Types of information systems. Management information systems, transactions processing systems, decisions support systems, office automation systems and knowledge-based systems.

Software Engineering: Components of Software process, process framework, process assessment, Software Life Cycle Models, Selection criteria, Process change management, Requirement Engineering process, Feasibility Study, Requirements Analysis – Structured Analysis, Object Oriented Modelling, Other approaches, Requirements Management.

Software Design – basic principles, concepts, Data design, Data Architectural design, Component level design, User Interface design, Pattern based Software design, Design Notations, Design Reviews – types, process, evaluating reviews, Software Design Documentation.

ERP: Computer Programming, ERP Modules, Benefits of ERP System etc.