प्रपत्र-अ

1) Syllabus for recruitment for the posts of

Post- Junior Engineer (Civil) सेवाप्रवेश नियमानुसार नाव- **कनिष्ठ अभियंता (स्थापत्य)**

English and Marathi Language (30 Questions) ***Level- H.S.C***

1. **Marathi (15 questions)**
   1. **सर्वसाधारण शब्दसंग्रह**
   2. **वाक्यरचना**
   3. **व्याकरण**
   4. **म्हणी व वाक्प्रचार यांचा अर्थ आणि उपयोग**
   5. **उता-यावरील प्रश्न**
2. **English (15 questions)**
   - General Vocabulary
   - Sentence Structure
   - Grammar
   - Idioms and Phrases –Their meaning and Use
   - Comprehension
3. **Intellectual Test (15 Questions)** ***Level- Graduate***
   - General Intelligence and Assessments
   - Logic Based Questions
   - Arithmetic Based Questions
4. **General Knowledge (15 questions)** ***Level- Graduate***
   - History of India,Indian National Movement with important events in Maharashtra
   - Geography of Maharashtra/India/World- Physical, Social & Economic Geography
   - Government of India & Maharashtra- Power & Governance, Constitution, State Organisation, Public Policies & Public rights
   - Economic and Social Development- Sustainable Development Goals, Poverty Inclusion, Demographic , Activities related to Social welfare
   - General Science & Technology
   - Biodiversity and Climate change due to Environment condition ,Social problem,Human Development & Environment
   - Indian Economy, development Economics, Growth & Development
   - Current affairs- International, National & Maharashtra
   - Agriculture And Rural Development
   - Geography, Social history, Climate etc about the District (i.e Nagpur,Maharashtra) & Local Issues and features /Specialities of the district.

• Domain specific to Post (40 questions)

Engineering Mechanics & Strength of materials

Mechanics and forces systems, resolution and composition of forces, beams–reaction, centroid and center of gravity, friction, simple lifting machines, Moment of Inertia, Simple Stresses & strains, principal stresses, bending moments, shear forces, bending & shear stresses in beams, deflection of beam, theories of columns.

• **Theory of structures**

Direct and bending stresses, fixed and continuous beams, simple trusses, slope deflection method, moment distribution method.

• **Steel Structures**

Introduction to steel structure, types, loads acting on steel structures, Design of bolted and welded connections

• **Design of Reinforced concrete Structures (Limit State method)**

Design of slab, beams, columns, footing. Water tanks (WSM).

• **Concrete Technology**

Cement-grades, test, properties, aggregates, concrete, test on concrete, factors affecting concrete, water cement ratio, aggregate cement ratio, mix design, quality control of concrete, additives in concrete

• **Geotechnical Engineering**

Geotechnical properties, stresses in soil, shear resistance, compaction, consolidation and earth pressure, stability of slopes, bearing capacity, settlements, shallow and deep foundations, basic engineering geology.

• **Construction Materials**

Stones, bricks, cement, lime, mortar, timber, plastic, concrete, steel, paints and varnishes Bitumen, mastic asphalt, emulsion, cutback, stone matrix asphalt, fly ash, sustainable building materials, glass, artificial materials.

• **Surveying**

Classification of surveys, measurement of distances-direct and indirect methods, optical and electronic devices, prismatic compass, local attraction; plane table surveying, levelling, volume calculation, contours, theodolite, theodolite traversing, omitted measurements, trigonometric levelling, tachometry, curves, advanced instruments in surveying (EDM, Total station), introduction to remote sensing, GPS & GIS.

• **Building Planning and Construction**

Principles of building planning and design, building bylaws, building services such as vertical transportation, water supply, sanitation, thermal ventilation,

lighting, acoustics. Types of foundations, brick and stone masonry, types offloors, doors and windows, roofs,finishing works, water proofing, types of formwork.

- **Fluid mechanics**

Properties of fluids, fluid statics and buoyancy, introduction to kinematics and dynamics, flow measurement, flow in open channel, flow in closed conduits, losses in pipe flow, pipe network,introduction to centrifugal pumps & reciprocating pumps

- **Water Resources Engineering**

Hydrological cycle, precipitation, runoff, hydrograph, Water requirement of crops, methods of irrigation, lift irrigation, reservoir planning & sediment control, dams, spillways, barrages, diversion head works, canal and canal structures, cross-drainage works, micro & minor irrigation (Bandhara, Percolationtank, drip and sprinkler, well,Jal yukt shivar)

- **Highway Engineering**

Planning of highway systems, alignment and geometric design, horizontal and vertical curves, grade separation, cross sectional elements of highway, thin and ultra thin white topping, overlays, construction and maintenance of rigid and flexible pavement, traffic volume and analysis

- **Bridge Engineering**

Selection of site, types of bridges, pre-stressed bridge, culverts, Constructionand maintenance

- **Estimating, costing and valuation**

Specification, estimation, costing, tenders and contracts, rate analysis, valuation

- **Public Health Engineering**

Water supply Engineering:

Sources of supply, intakes, estimation of demand, water quality standards, primary and secondary treatment, maintenance of treatment units, conveyance and distribution of treated water, rural water supply.

Wastewater Engineering:

Quantity, collection and conveyance, disposal, characteristics of sewage andits treatment, rural sanitation.

Introductory Solid waste management:Sources, classification, collection, Treatment and disposal

- **Construction Planning and management**

Functions of management, Elements of material management, safety engineering, network analysis (Introduction to Bar and CPM), construction equipment, site layout, various acts related to workers and industry (workmen compensation act, factories act, minimum wages act, etc.)

2) Syllabus for recruitment for the posts of

Post- Junior Engineer (Electrical) सेवाप्रवेश नियमानुसार नाव- **कनिष्ठ अभियंता (विद्युत)**

English and Marathi Language (30 Questions) ***Level- H.S.C***

1. **Marathi (15 questions)**
   1. सर्वसाधारण शब्दसंग्रह
   2. वाक्यरचना
   3. व्याकरण
   4. म्हणी व वाक्प्रचार यांचा अर्थ आणि उपयोग
   5. उता-यावरील प्रश्न
2. **English (15 questions)**
   - General Vocabulary
   - Sentence Structure
   - Grammar
   - Idioms and Phrases –Their meaning and Use
   - Comprehension
3. **Intellectual Test (15 Questions)** ***Level- Graduate***
   - General Intelligence and Assessments
   - Logic Based Questions
   - Arithmetic Based Questions
4. **General Knowledge (15 questions)** ***Level- Graduate***
   - History of India, Indian National Movement with important events in Maharashtra
   - Geography of Maharashtra/India/World- Physical, Social & Economic Geography
   - Government of India & Maharashtra- Power & Governance, Constitution, State Organisation, Public Policies & Public rights
   - Economic and Social Development- Sustainable Development Goals, Poverty Inclusion, Demographic , Activities related to Social welfare
   - General Science & Technology
   - Biodiversity and Climate change due to Environment condition ,Social problem, Human Development & Environment
   - Indian Economy, development Economics, Growth & Development
   - Current affairs- International, National & Maharashtra
   - Agriculture And Rural Development
   - Geography, Social history, Climate etc about the District (i.e Nagpur, Maharashtra) & Local Issues and features /Specialities of the district.

• **Domain specific to Post (40 questions)**

• **Basics of electrical Engineering**

1. Current, EMF, potential difference, internal resistance, terminal voltage
2. AC & DC supply, single phase & three phase AC supply
3. Resistance, resistivity, Heating effect of electric current
4. Ohm's law & its application. Series parallel combination of resistances.
5. Kirchhoff's laws & its applications.
6. Capacitors, Series parallel combination of capacitors.
7. Magnetic effect of electric current, Electro-magnetism
8. Faradays laws of electromagnetic induction, Lenz's law
9. Self & mutually induced EMF
10. Static & dynamically induced EMF
11. Eddy current & hysteresis losses
12. Reactance, Impedance, power factor, active, reactive, apparent power
13. Phase sequence, types of three-phase connections, Phase and line quantities in three phase star and delta system
14. Balanced and unbalanced loads.
15. Power measurement in single phase & three phase circuits.

• Generation, Transmission & Distribution of Electric Power

1. Types of power plants & their capacities. Alternator basics, speed & frequency.
2. Load curve, load shading, state & national grid
3. Voltage levels for Generation, Transmission & Distribution of Electric Power
4. Basics of transmission & distribution
5. Types of AC distribution systems
6. Single line diagram of transmission
7. Transmission line parameters
8. Transmission and Distribution Line Components - Overhead Conductor, Underground Cables, Line supports, Line Insulators

• Electrical Materials & wiring Practices

1. IE rules of safety, Wiring components, tools and safety devices
2. Significance & properties , classification, types & applications of conducting and insulating materials
3. Types of wiring, cable laying & cable jointing
4. Earthing

• Induction motors & Transformers

1. Construction & working of three phase & single phase induction motors
2. Starting & reversal of three phase induction motors

3. Types of starters for three phase induction motors
4. Methods of speed control of three phase induction motors
5. Construction & working of three phase & single phase transformers

- Switchgear & Protection

1. Basics of protection, types of faults
2. Circuit interrupting devices such as Isolators, HRC fuses, LT nd HT Circuit breakers
3. Protective relays: Basic relay terminology and types of relays
4. Protection of Transformer, Motors, Bus-bar and transmission line

- **Illumination**

1. Illumination terminology
2. Laws of illumination
3. Various types of lamps
4. Various lighting schemes
5. Domestic and industrial lamp fittings
6. Bombay Lift Act 1939
7. Elevators
8. Factor controlling shapes and size of car

- Renewable Energy Sources

1. Construction & working of solar power plants. Types of collector for Solar power plant
2. Solar PV power plant.
3. Wind power generation
4. Horizontal & vertical axis wind turbine. Location & installation of wind turbines

- Maintenance of Electrical Equipment

1. Types of maintenance
2. O.C. & S.C. test on transformer
3. Faults in three phase & single phase induction motors & troubleshooting
4. Faults in of three phase & single phase transformers & their remedies

- Energy Conservation

1. Indian Electricity Act 2001
2. BEE and its Roles
3. MEDA and its Roles
4. Star Labelling
5. Energy conservation techniques in induction motor

6. Energy conservation techniques in Transformer
7. Energy Conservation Equipment
8. Energy efficient motors &transformers
9. Energy Conservation in Lighting System
10. Tariff & their types
11. Application of tariff system to reduce energy bill

- Electrical Estimation & contracting

1. Electrical hazards & safety in electrical work
2. Methods of resuscitation, CPR
3. Fundamental principles for electrical installations
4. Single line & multi line wiring diagram
5. Interpretation of electrical installation plan and electrical diagrams
6. Design consideration of electrical installation in commercial buildings
7. Design electrical installation scheme of commercial complex
8. Classification of outdoor installations, streetlight/ public lighting installation
9. Terminology used according to NEC 2011
10. Selection of equipment, sources used in street light installations.
11. Design, estimation and costing of streetlight
12. Factors to be considered while preparation of detailed estimate and economical execution of work.
13. Concepts of contracts, types of contracts, contractor, role of contractor, qualities of good contractor
14. Type of tender, tender notice, preparation of tender document, and method of opening of tender Quotation, quotation format, comparison between tender and quotation. Comparative statement, format of comparative statement. Order format, placing of purchasing order

3) Syllabus for recruitment for the posts of

Post- Nurse (G.N.M) सेवाप्रवेश नियमानुसार नाव- **नर्स परिचारीका (जी.एन.एम)**

English and Marathi Language (30 Questions)

English and Marathi Language (30 Questions) ***Level- H.S.C***

1. **Marathi (15 questions)**
   1. **सर्वसाधारण शब्दसंग्रह**
   2. **वाक्यरचना**
   3. **व्याकरण**
   4. **म्हणी व वाक्प्रचार यांचा अर्थ आणि उपयोग**
   5. **उता-यावरील प्रश्न**
2. **English (15 questions)**
   - General Vocabulary
   - Sentence Structure
   - Grammar
   - Idioms and Phrases –Their meaning and Use
   - Comprehension
3. **Intellectual Test (15 Questions)** ***Level- H.S.C***
   - General Intelligence and Assessments
   - Logic Based Questions
   - Arithmetic Based Questions
4. **General Knowledge (15 questions)** ***Level- H.S.C***
   - History of Modern India
   - Geography of India & Maharashtra
   - Indian Economy
   - Structure Organisation functions of Village Administration, District Administration , State Administration
   - Social Reformer in Maharashtra
   - Current affairs
   - India's relations with neighbouring countries
   - Agriculture And Rural Development
   - Geography, Social history, Climate etc about the District (i.e Nagpur,Maharashtra) & Local Issues and features /Specialities of the district.

- **Domain - (40 Question)**
- RCH Programme, NURSING ART , Anatomy Physiology, Microbiology, Medical Surgical Nursing Part-I and II, Mental Health- Psychiatric, Midwifery & Gynaecology, Paediatric Nursing , Community Health Nursing Part-I and II , Biochemical waste management rules, Immunisation , Administrative work.

4) Syllabus for recruitment for the posts of

Post- Tree Officer सेवाप्रवेश नियमानुसार नाव- **(वृक्ष अधिकारी)**

English and Marathi Language (30 Questions) ***Level- H.S.C***

1. **Marathi (15 questions)**
   1. **सर्वसाधारण शब्दसंग्रह**
   2. **वाक्यरचना**
   3. **व्याकरण**
   4. **म्हणी व वाक्प्रचार यांचा अर्थ आणि उपयोग**
   5. **उता-यावरील प्रश्न**
2. **English (15 questions)**
   - General Vocabulary
   - Sentence Structure
   - Grammar
   - Idioms and Phrases –Their meaning and Use
   - Comprehension
3. **Intellectual Test (15 Questions)** ***Level- Graduate***
   - General Intelligence and Assessments
   - Logic Based Questions
   - Arithmetic Based Questions
4. **General Knowledge (15 questions)** ***Level- Graduate***
   - History of India,Indian National Movement with important events in Maharashtra
   - Geography of Maharashtra/India/World- Physical, Social & Economic Geography
   - Government of India & Maharashtra- Power & Governance, Constitution, State Organisation, Public Policies & Public rights
   - Economic and Social Development- Sustainable Development Goals, Poverty Inclusion, Demographic , Activities related to Social welfare
   - General Science & Technology
   - Biodiversity and Climate change due to Environment condition ,Social problem,Human Development & Environment
   - Indian Economy, development Economics, Growth & Development
   - Current affairs- International, National & Maharashtra
   - Agriculture And Rural Development
   - Geography, Social history, Climate etc about the District (i.e Nagpur,Maharashtra) & Local Issues and features /Specialities of the district.

- **Domain - (40 Question)**
- **Plant Science** - Cryptogams, Phanerogams, Fundamentals of: Cell Biology, Genetics, Molecular Biology and Evolution.

- Agriculture - Fundamentals of: Agronomy, Breeding, Seed Technology, Plant Pathology, Plant Biochemistry, and Plant Physiology
- Fundamentals of Horticulture and Ornamental Horticulture
- Plant Propagation methods and Nursery Techniques
- Fundamentals of Soil Science
- Biodiversity and its conservation
- Environmental Studies and Disaster Management
- Introduction to Forestry and Tree Improvement
- Agroforestry, Social Forestry - Objectives, Scope, and necessity
- Agriculture and Forest- Basic Tools and Machinery
- Common Plant and Tree Species in Maharashtra

5) Syllabus for recruitment for the posts of

Post- Civil Engineering Assistant सेवाप्रवेश नियमानुसार नाव- **स्थापत्य अभियांत्रीकी सहाय्यक**

- **English and Marathi Language(30 Questions)** ***Level- S.S.C***

1. **Marathi (15 questions)**

- **सर्वसाधारण शब्दसंग्रह**
- **वाक्यरचना**
- **व्याकरण**
- **म्हणी व वाक्प्रचार यांचा अर्थ आणि उपयोग**
- **उता-यावरील प्रश्न**

2. **English (15 questions)**

- General Vocabulary
- Sentence Structure
- Grammar
- Idioms and Phrases –Their meaning and Use
- Comprehension

3. **Intellectual Test (15 Questions)** ***Level- S.S.C***

- General Intelligence and Assessments
- Logic Based Questions
- Arithmetic Based Questions

4. **General Knowledge (15 questions)** ***Level- S.S.C***

- History of Modern India
- Geography of india & Maharashtra
- Indian Economy
- Structure Organisation functions of Village Administration, District Administration , State Administration
- Social Reformer in maharashtra
- Current affairs- India & Maharashtra
- India's relations with neighboring countries
- Agriculture And Rural Development
- Local aspects/Specialities of concerned district (i.e Nagpur, Maharashtra), Geography, Social history, Climate etc.

5. Domain specific to Post (40 questions)

Brick work :-Sizes ,manufacturing, ,characteristics and methods of testing bricks. Terms used :- Stretched ,header, Closer. English bond. Flemish bond, Arrangement of bricks Brick-walls :- Relationship between thickness and length and height, practical rules for determining, thickness of different walls Footing, Brick-piers, Jambs. Function of mortar, first, second, third class brick work.

Shrinkage and settlement in new brick work, units of measurement of brick work; number of bricks and quantity of mortar required for walls of different thickness.

• **Rubble Masonry** :- Types and characteristics of building stone, Types of rubble, Masonry theory, characteristics and general specifications. Stone dressing, Face, bed and joints, and secret-key joints. Terms used, e.g. Coping, Cornice, String course, Architrave, window still, steps, rebate, nosing throttling ,Base and cap for pillars, Jambs, Soffits and Fascia courses. Function of mortar in Masonry. Mode& units of measurements, plaster & pointing. Shrinkage of mortar joints.

• **Concrete and concrete construction** :- (a) Cement concrete - Ingredients, Coarse and fine aggregate cement and water; characteristics and function of each. Water – Cement ratio. Bulking of sand. Grading of aggregates-sieve analysis, fineness modulus. Common mixes of concrete Times of mixing. Concrete mixers, hoist, chutes. Transporting and placing concrete. Measurement of slump. Vibration and compaction, vibrators. Construction joints-. Sand blasting, green-cutting. curing of concrete Segregation, honey-combing, beading, harshness, their causes and precautions to avoid them, concrete test, Use of admixture and wetting agents. Nature of cracks repair method, Expansion and construction joints frame work, scaffolding deshuttering time

• **Plaster and pointing** - Methods of Plastering , neeru finish. Cement plaster – common proportions used. Two coat work, rough cast, stucco and other type of types of finishes. Gauged cement plasters, Pointing - Proportion of mix. Different types of pointing finishes.

• **Wood work and joinery**: - Types ,characteristics, seasoning of good timber. Defects-knots, shakes, cracks etc. Dry rot, wet rot. Terms used :- Logs, squares, scantlings,boarding, battens, etc.. Preservation, Joints used, Timber floors; types and methods ofconstruction, joists, beams, girders. Joinery - Frames, door and window shutters, common sizes of scantlings used, hold-fast. Panelled, glazed,louvered, framed andbattened shutters. Block-board shutters. Timber partitions and construction details. Panelling and dadoes to walls. Roof coverings - Country tiles, Mangalore titles. G.I.sheeting, Asbestos cements roofing, methods of fixing. Ridges, valleys and flashings.Reconstructed and artificial wood products and their uses; hand board soft, board,Masonite, block boards, veneers, wains slotting.

• **Structural Steel work :-** Rolled sections - Joists, channels, tees, angles and plates.Compound sections, bolts, rivet and welded connections. Steel trusses, steel purlins and Steels columns, girders and beam. Typical connections. Foundation bolts and methods, Steel roofs, north light roofing Glazing.Steel window, Steels doors, Rollingand folding stutters.

• **Floors and floor finishing :-** Types of flooring Qualities of good flooring

materials and relative merits different types. Special features and details of construction. Polishing floors. Maintenance of floors. Dados and linings to walls.

- **Painting, Varnishing, polishing and surface finishes :-** Characteristics, qualities andfunctions of ingredients used. Techniques of preparation and execution. Types of Ready-mixed paints, Covering capacity of paints on masonry, steel and wood. Texture of finish and its effect on lighting and acoustics .Plaster of paris Proprietary materials for lining walls and ceiling for improving acoustics. Water proofing and water repelling treatments :- Use of Asphaltic and bituministic products. China mosaic Brick bat jelly etc. for water proofing terraces and flat roots. Proprietary water proofing materials and their uses in treating walls of basement, water-tanks, etc. Gunning

- **Foundation :-** Classification of soils -side slopes for excavation in different soils. Shoring and strutting in soft and water-logged soils and in deep excavation, Dewatering. Function of footings; column footings. Raft foundations; Timber piles; R.C.C. piled foundations.
- Domestic services :- (a) Sanitary fittings; W.Cs. lavatory basins, urinals, etc. latrines and privies. Internal plumbing: - Traps and anti-syphonage precautions. connections of sanitary fittings ,Flushing tanks. Wiped joints house drains, connections to sewers, gullies, inspection chambers and manholes. Testing ofdrains .Water-supply-overhead tanks, service connections; C.I.G.I. water supply pipes and method of joints. Devices to save wastage of water. House meters.

- **Door And Window-**Functions ,Rules, parts, material used for Door and window, Types offrames, and shutter and Fixtures & fastenings for Doors and windows,Grills for window

- **Stairs -** Terms used in Stair, Classification of stairs based on shape and materials used for construction. Requirements of goodstairs, Design of stair Thumb Rules for Design of Dog legged stair Hand Rails Types and Fixing Procedure

- **Detailed Theory Syllabus** -Introduction Meaning of Term Estimating, costing Types of Estimate, Approximate Estimate ,Details Estimate, Estimate for Building Methods of preparing Approximate Estimate for Buildings, Plinth Area Method, Cubical Unit, Service Unit, Bay Unit

- **Detail Estimate** -Definition data required, and uses of Detail Estimate, Taking out quantities, Measurement sheet abstract sheet. unit of measurement. Definition of contingencies, work charge establishment, Provisions in details estimate for sanitary, water supply, Electrification. Types of Estimates, Detail Estimate,Revised Estimate, Supplementary Estimate, Annual report and Maintenance Estimate, Special Report Estimate, Additions and Alteration Estimate. Procedure of calculating Quantities for excavation, Foundation concrete, Foundation & plinth Masonry, Super Structure

- **Working out of quantities of Steel for R.C.C work**-Division of R.C.C work into concrete Steel and Form work, Study of Reinforced steel for Bar diameter, its eight, Calculating Length and weight of steel for Straight bas with hook or El at ends Bent up bar with hook

- **Modes of Measurements**- Points Considered while fixing unit of measurement, Modes of measurements

- **Rate Analysis** - Meaning of Term Rate Analysis, Necessity, Factors affecting Rate analysis, Rates of Material and Labor as per DSR. Task work and factors affecting it. Different Task work, Methods of payment to labor. Transportation of material and its effect on rate analysis, Lead & lift, Standard schedule of Rate.

- **Specifications-**Necessity and types of Specification, Points to be observed while framing specifications Study of Standard specification Book from organizations such as PWD, MHADA, CIDCO etc.

- **Tender Document & Tender Notice** -List of Tenders document, Necessity of Tender, Points to be observed while framing Tender Notice, Drafting of Tenders Notice, Explanation of Terms: Earned Money, Security Deposit, Validity Period, Right for Rejection of one or all tenders Corrigendum to Tenders Notice, Procedure of Submitting filled Tender, Opening of Tender, Scrutiny of Tender, Comparative Statement, Finalizing Tender, Work order, Rejection of tenders, Unbalanced Tender, Ring formation, Negotiations, Point to be observed by contractor while filling a tender.

- **Conditions of Contract** -- Definition, its necessity and types, General and special Conditions of contract, Drawing, Bill of Quantity, site possession for execution, Inspection of Materials, Inspection of completed item of works, Water charges and Light Charges, Extension of Time Limit, Termination of Contract, Subletting of work, Suspension of work, Extra Item, Payment to contractor, Clearance of file & Completion Certificate, Defects Liability Period, Price Escalation Clause, Adherence to labor laws, Arbitration, Reward / Penalty clause

- **Payment to Contractors**- Modes of Payment to contractor, Interim payments and its necessity, Types of payment -Advance payment, Secured Advance Payment, On Account Payment, Final Payment, First & final Payment, Retention Money and its Necessity, Reduced Rate Payment, Petty advance, Mobilization Advance Measurement Book, Indent Invoice ,Recoveries

- **Procedure of Execution of work in P.W.D**.-Organization set up of PWD, PWD procedure of initiating work, Administrative Approval, Technical Sanction, Expenditure section, Budget Provision Methods of Executing work, Contract Method, Departmental Method, Nominal Muster Roll, Rate List Method, Piece Work Method, Day Work Method

- **Introduction**- Definition, object, uses, principle of Surveying, Types of Survey: Plain Survey & Geodetic Surveying. Scales - its types and uses

- **Linear Measurement** -Study of 20m and 30m chains and its parts, metallic woven tape, steel Tape. Instruments - peg; arrows; ranging rod. Fixing of stations; points to be observed in selection of station. Procedure of chaining between two stations. Entering in Field Book, Testing of chain and tape before and after chaining of line.
- Chain and Cross Staff Surveying, Study of Cross Staff and Optical Square and their use. Chain Triangulation, Selection of Stations Setting up various lines offset, Conventional signs : Chaining across an obstacles
- Chain and compass Survey- Prismatic Compass- Study, parts, function, setting up, Definition of Bearing; Fore Bearing and back bearing, Finding included angle, Difference in Fore and Back bearing of a line .Definition of Open Traverse and Closed Traverse - method of plotting Bowditch's rule Local Attraction, Definition , errors, precaution, correction of bearing, field book

Deputy Commissioner (GAD)
Nagpur Municipal Corporation