<table>
<tr><th>Sl No</th><th>Nodal Officer</th><th>Department</th><th>Post Name</th><th>Syllabus for the Post</th></tr>
<tr><td>1</td><td>Andaman Public Work Department</td><td>(A) Andaman Public Work Department</td><td>Junior Engineer (Civil)</td><td>

Scheme of Examination:-

<table>
<tr><th>S. No.</th><th>Details</th><th>Questions shall carry one mark</th><th>Marks per question</th><th>Total Marks</th><th>Duration/Timing for all candidates.</th></tr>
<tr><td>1.</td><td>(Concerned Technical Subject)
Junior Engineer(Civil)</td><td>80</td><td>02</td><td>160</td><td rowspan="8">2 Hours 10.00 AM to 12 Noon(No entry after 9.30 AM) and 2.00 PM to 4.00 PM (No entry after 1.30 PM)</td></tr>
<tr><td>2</td><td>General Intelligence & Reasoning.</td><td>10</td><td>02</td><td>20</td></tr>
<tr><td>3</td><td>General Awareness</td><td>10</td><td>02</td><td>20</td></tr>
<tr><td>4</td><td>Total Marks</td><td>100</td><td>02</td><td>200</td></tr>
<tr><td>5</td><td>Each correct Answer</td><td>02</td><td></td><td></td></tr>
<tr><td>6</td><td>Each wrong Answer</td><td>(-).0.25 (Minus 0.25)</td><td></td><td></td></tr>
<tr><td>7</td><td>Not attempted</td><td>0</td><td></td><td></td></tr>
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SYLLABUS FOR RECRUITMENT OF JUNIOR ENGINEER (CIVIL):-

1. **Building Materials**: Physical and chemical properties, classification, standard tests, uses and manufacture/quarrying of materials e.g. building stones, silicate based materials, cement (Portland), Asbestos products. Timber and Wood based Products, laminates, bituminous materials, paints, varnishes.
2. **Concrete Technology**: Properties, Advantages and uses of concrete, cement aggregates,importance of water quality, water cement ratio, workability, mix design, storage, batching, mixing, placements, compaction, finishing and curing of concrete,

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				quality control, hot weather and cold weather concreting, repair and maintenance of concrete structure, Admixture and additives. 3. **Surveying**: Principles of surveying, working of prismatic, compass and bearings, plane table surveying, theodolite traverse, adjustment of theodolite, leveling and contouring, curvature, refraction correction, permanent adjustment of dumpy level, methods of contouring and uses of a contour map, tacheometric survey, Curves, Horizontal and Vertical Curves. 4. **Soil Mechanics**: Origin of soil phase diagram, definitions of void ratio porosity, degree of saturation, water content specific gravity of soil grains and unit weights, grain size distribution curves for different solid and their uses, Atterberg's limit, ISI soil classification, plasticity chart, coefficient of permeability, effective stress, consolidation of soils. Classification, shear strength of soils, direct shear test, vane shear test, triaxial test, soil compaction, Lab compaction, Lab compaction test, moisture content and bearing capacity of soil, plate load test standard penetrationtest. 5. **Theory of Structures**: Elasticity constants, Types of beams, determinate and indeterminate, Bending moment and shear force diagrams of simply supported, cantilever and over hanging beams, Moment of areaand moments of inertia for rect. & circular section, bending moments of shear stress for tee, channel and compound sections, chimneys, dams and retaining walls, eccentric loads slope deflection of simply supported and cantilever beams, critical load columns, torsion of circular section. 6. **RCC & Steel Design**: RCC beams, flexural strength, shear strength, bond strength, design of single reinforce beams, lintels, cantilever beams, double reinforced beams, one way slabs two way slabs, reinforced brick work, T-beams, columns, staircases, retaining walls, water tanks steel design, welded connections, riveted joints, design and construction of steel columns, beams roof trusses plate girders. 7. **Hydraulics**: Fluid properties, hydrostatics, measurements of flow, Bernoull's theorem and its application, flow through pipes, flow in open channels, weirs, flumes spillways, pump and turbines. 8. **Public Health Engineering**: Quality of water, source of water supply, purification of water, distribution of water, need of sanitation, sewerage systems, circular sewers oval sewers, sewer appurtenances surface water drainage, sewage treatments. 9. **Transport and Highway Engineering**: Classification of Highway, Structural and geometrical components, Design of various elements of highway, Junction and intersection, Type of curves, Elements of curves, Setting out of curves, Materials for

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<td>highway their testing and types, Physical, Chemical and Mechanical properties, Classification of traffic, Traffic survey, Important characteristics and Highway Construction.
10. Port- Harbour and Airport: Definitions and Classifications, Important Components and their Characteristics, Site Investigation and Requirement, Navigation and Control, Essential Amenities and Requirement.
11. Estimating Costing & Valuation: Estimate, glossary of technical terms, analysis of rates, methods and unit of measurement, Item of Works – earthwork, Brickwork (Modular & Traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering, Boundary wall, Brick building, water tank, septic tank, bar bending schedule, Centre line method, Mid-section formula, trapezoidal formula, Simpson’s rule, Cost estimate of Septic tank, flexible pavements, Tube well,, isolates and combined footings, steel truss, piles and pile caps. Valuaton –value and cost, scrap value, salvage value assessed value, sinking fund, depreciation and obsolescence, methods of valuation.</td>
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<tr>
<td>2</td>
<td>Andaman Public Work Department</td>
<td>(B) Andaman Public Work Department</td>
<td>Planning ASSISTANT</td>
<td>Scheme of Examination:-
<table>
<tr><th>S. No.</th><th>Details</th><th>Questions shall carry one mark</th><th>Marks per question</th><th>Total Marks</th><th>Duration/Timing for all candidates.</th></tr>
<tr><td>1.</td><td>(Concerned Technical Subject)
<u>Planning Assistant</u></td><td>80</td><td>02</td><td>160</td><td rowspan="7">2 Hours
10.00 AM to 12 Noon(No entry after 9.30 AM) and 2.00 PM to 4.00 PM (No entry after 1.30 PM)</td></tr>
<tr><td>2</td><td>General Intelligence & Reasoning.</td><td>10</td><td>02</td><td>20</td></tr>
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				RECRUITMENT FOR THE POST OF PLANNING ASSISTANT SYLLABUS FOR PLANNING ASSISTANT (CIVIL ENGINEERING STREAM) 1. **APPLIED & ENGINEERING GEOLOGY**: General Geology, Mineralogy, Petrology, Structural Geology and Geophysical Method, Geological Investigations in Civil Engineering. 2. **MECHANICS OF SOLIDS**: Stress Strain and Deformation of Solids, States of Stress, Analysis of Plane Truss, Thin Cylinders / Shells, Transverse Loading on Beams, Deflection of Beams And Shear Stresses, Torsion And Springs. 3. **MECHANICS OF FLUIDS**: Definitions and Fluid Properties, Fluid Statics & Kinematics, Fluid Dynamics, Boundary Layer and Flow through Pipes, Similitude and Model Study. 4. **CONSTRUCTION TECHNIQUES, EQUIPMENT AND PRACTICES:** Concrete Technology, Construction Practices, Sub Structure Construction, Super Structure Construction, Construction Equipment. 5. **SURVEYING I & II :** Introduction And Chain Surveying, Compass Surveying And Plane Table Surveying, Leveling And Applications, Theodolite Surveying, Engineering Surveys. Tachometric Surveying, Control Surveying, Survey Adjustments, Astronomical Surveying, Hydrographic and Advance Surveying. 6. **SOIL MECHANICS:** Introduction Soil Mechanics, Soil Water and Water Flow, Stress Distribution, Compressibility and Settlement, Shear Strength, Slope Stability. 7. **STRENGTH OF MATERIALS:** Energy Principles, Indeterminate Beams, Columns, State of Stress in Three Dimensions, Advanced Topics in Bending of Beams. 8. **APPLIED HYDRAULIC ENGINEERING:** Open Channel Flow, Uniform Flow, Varied Flow, Pumps, Turbines. 9. **HIGHWAY ENGINEERING:** Highway Planning and Alignment, Geometric Design of Highways, Flexible and Rigid Pavements, Highway Materials and Construction Practice, Highway Maintenance. 10. **IRRIGATION ENGINEERING:** Introduction of Irrigation Engineering, Irrigation Methods, Diversion and Impounding Structures, Canal Irrigation, Irrigation Water Management. 11. **STRUCTURAL ANALYSIS I & II :** Deflection of Determinate Structures, Moving Loads And Influence Lines, Arches, Slope Deflection Method,

				Moment Distribution Method. Flexibility Method, Stiffness Matrix Method, Finite Element Method, Plastic Analysis of Structures, Space and Cable Structures. 12. **RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING:** Railway Planning and Design, Railway Track Construction, Maintenance and Operation, Airport Planning and Design, Airport Layouts, Visual Aids, and Air Traffic Control, Harbour Engineering. 13. **ENVIRONMENTAL ENGINEERING – I & II :** Planning For Water supply System, Conveyance System, Water Treatment, Advanced Water Treatment, Water Distribution And Supply to Buildings. Planning For Sewerage Systems, Sewer Design, Primary Treatment of Sewage, Secondary Treatment of Sewage, Disposal of Sewage and Sludge. 14. **FOUNDATION ENGINEERING:** Site Investigation and Selection of Foundation, Shallow Foundation, Footings and Rafts, Piles, Retaining Walls. 15. **DESIGN OF RC ELEMENTS:** Methods of Design of Concrete Structures, Limit State Design For Flexure, Limit State Design for Bond, Anchorage Shear & Torsion, Limit State Design of Columns, Limit State Design of Footing And Detailing. 16. **DESIGN OF STEEL STRUCTURES:** Introduction of Design of Steel Structures, Tension Members, Compression Members, Beams, Roof Trusses and Industrial Structures. 17. **CONSTRUCTION PLANNING & SCHEDULING:** Construction Planning, Scheduling Procedures and Techniques, Cost Control Monitoring and Accounting, Quality Control and Safety During Construction, Organization and Use of Project Information. 18. **ENVIRONMENTAL AND IRRIGATION ENGINEERING DRAWING:** Water Supply And Treatment, Sewage Treatment & Disposal, Impounding Structures, Canal Transmission Structures, Canal Regulation Structures. 19. **DESIGN OF REINFORCED CONCRETE & BRICK MASONRY STRUCTURES:** Retaining Walls, Water Tanks, Selected Topics, Yield Line Theory, Brick Masonry. 20. **ESTIMATION AND QUANTITY SURVEYING:** Estimate of Buildings, Estimate of Other Structures, Specification and Tenders, Valuation, Report Preparation. 21. **BASICS OF DYNAMICS AND ASEISMIC DESIGN:** Theory of Vibrations, Multiple Degree of Freedom System, Elements of Seismology, Response of Structures to Earthquake, Design Methodology.

				22. **PRESTRESSED CONCRETE STRUCTURE:** Introduction – Theory and Behavior, Design Concepts, Circular Prestressing, Composite Construction, Pre- Stressed Concrete Bridges. 23. **ENGINEERING ECONOMICS AND COST ANALYSIS:** Basic Economics, Demand And Schedule, Organization, Financing, Cost And Break Even Analyses. 24. **HYDROLOGY:** Precipitation, Abstraction from Precipitation, Hydrographs, Floods and Flood Routing, Ground Water Hydrology. 25. **CARTOGRAPHY:** Introduction of Cartography, Earth, Sources of Data, Perception and Design, Cartography Abstraction. 26. **ELECTRONIC SURVEYING:** Basic Electronics, Propagation of Electromagnetic Waves, Electromagnetic Distance Measuring System. 27. **REMOTE SENSING TECHNIQUES AND GIS:** EMR and Its Interaction with Atmosphere & Earth Material, Platforms and Sensors, Image Interpretation and Analysis, Geographic Information System, Data Entry, Storage and Analysis. 28. **ARCHITECTURE:** Architectural Design, Site Planning, Building Types, Climate and Environmental Responsive Design, Town Planning. 29. **TOTAL QUALITY MANAGEMENT:** TQM Principles, TQM Tools & Techniques, Quality Systems. 30. **FUNDAMENTALS OF NANOSCIENCE:** Preparation Methods, Patterning and Lithography for Nano scale Devices, Preparation Environments, Characterisation Techniques. **SYLLABUS FOR PLANNING ASSISTANT (ARCHITECTURE STREAM)** **1. MECHANICS OF STRUCTURES I& II** Forces and Structural Systems, Analysis Of Plane Trusses, Properties Of Section, Elastic Properties Of Solids, Elastic Constants. Shear Force and Bending Moment, Stresses In Beams, Deflection of Beams, Columns, Statically Indeterminate Beams **2. HISTORY OF ARCHITECTURE AND CULTURE II, III, IV, V & VI** Ancient India, Buddhist Architecture, Evolution of Hindu Temple Architecture, Temple Architecture - Southern India, Temple Architecture -Northern India. Early Christian, Early Medieval Period, Late Medieval Period, Renaissance and Mannerist, Baroque and Rococo. Introduction To Islamic Architecture, Islamic Architecture In India & Architecture Of The Delhi Sultanate, Islamic Architecture In The Provinces, Mughal Architecture, Cross-Cultural Influences. Leading To A New Architecture, Reviewing Industrialisation, Modern Architecture: Development And Institutionalisation, Modern Architecture : Later Directions, Colonial Architecture In India. Critiquing Modernism, After Modernism – I, After Modernism – Ii, Alternative Practices And Ideas, Post Independent Architecture In India

				3. BUILDING MATERIALS II, III & IV Bricks, Clay Products, Timber and Timber Products, Timber Products, Painting and Varnishing In Timber. Requirements Of Ingredients For Mortar/ Concrete, Cement Concrete And Its Manufacture, Types Of Concrete Aggregates And Concrete, Surface Finishing, Flooring And Damp-Proofing, Glass. Ferrous Metals: Steel And Steel Alloys, Innovations In Steel And Steel Industry, Non-Ferrous Metals, Plastics, Other Materials **4. BUILDING CONSTRUCTION I, II,III & IV** Introduction, Soils, Bamboo, Straw Bales, Stone. Bricks, Clay Products, Timber Joinery, Partitions, Paneling, False Ceiling, Timber Staircases, Timber Walls, Floors And Trusses. Concrete Construction, Water-Proofing And Damp-Proofing Of Concrete Structures, Design And Construction Methods For Concrete Staircases, Advanced Construction Systems Developed By Research Organisations In India, Glass. Steel Construction, Steel Doors, Windows And Rolling Shutters Aluminium Doors And Windows, Aluminium Partitions, Stairs, Curtain Walling, Roofing, Plastics **5. THEORY OF ARCHITECTURE** Introduction to Architecture and Meaning In Architecture, Ordering Elements And Principles Of Architecture, Organisation Of Form And Space, Circulation and in Totality, Experiencing Architecture **6. ARCHITECTURAL DRAWING I** Sociography, Perspective: Scientific Method, Perspective: Short Cut Method, Measured Drawing: Historic Document Study, Measured drawing: Documentation **7. BUILDING SERVICES I,II & III** Water Supply And Water Distribution System, Water Quality Control And Distribution System, Water Management Concepts, Sanitary Waste And Sewerage System, Fundamentals, Sanitary Waste And Sewerage System, Waste Management Concept, Equipment's Used For Management Of Usable Water And Waste Water. Electrical And Electronic Systems: Electrical Wiring Systems, Fundamentals Of Lighting, Illumination And Lighting, Lighting Design: Installation And Application In Buildings, Lighting Design: Conveying Systems, Air Conditioning: Basic Refrigeration Principles, Air Conditioning: Systems And Applications, Air Conditioning: Design Issues And Horizontal Distribution Of Systems, Fire Safety: Design And General Guidelines Of Egress Design, Fire Safety: Fire Detection And Fire Fighting Installation **8. CLIMATE AND BUILT ENVIRONMENT** Climate And Human Comfort, Design Of Solar Shading Devices, Heat Flow Through Building Envelope Concepts, Impact Of Air Movement Due To Natural And Built Forms, Climate And Design Of Buildings **9. COMPUTER AIDED DRAFTING** Introduction To Computer And Image Editing, Introduction To Visual Composition Using Computer Tools, Introduction To Computer Aided 2d Drafting, Introduction To 3d Modelling,3d Rendering And Setting

				10. ARCHITECTURAL DESIGN I& II Scale and Complexity: projects involving small span, single space, single use spaces with simple movement, predominantly horizontal, as well as simple function public buildings of small scale; passive energy Areas of focus/ concern: architectural form and space a. aesthetic and psychological experience of form and space in terms of scale, colour, light, texture, etc., b. function and need: user requirements, anthropometrics, space standards, circulation c. image and symbolism Typology/ project: bedroom, bathroom, kitchen, shop, exhibition pavilion, children's environment, snack bar, residence, petrol bunk, fire station. Scale and Complexity **:** Project involving organization of multiples of single unit space with predominantly horizontal movement as well as single use public buildings of small scale; passive energy Areas of concern/ focus: d. form-space relationships e. spatial organization f. behavioral aspects especially those relating to children g. site planning aspects h. appropriate materials and construction Suggestive Typologies/ projects : residential buildings, institutional buildings: nursery or primary schools, schools for children with specific disabilities, primary health center, banks, neighborhood market, library **11. DESIGN OF STRUCTURES I, II & III** Timber Structures, Design of Beams And Columns, Steel Structures, Riveted And Welded Joints, Tension Members, Compression Members, Steel Beams. Methods of Design For Concrete Members, Limit State Design of Beams, Limit State Design of Slabs, Design of Circular Slabs, Design of Staircase By Limit State Method. Limit State Design of Columns, Design of Footings, Design of Retaining Walls, Design of Masonry Walls, Introduction to Prestressed Concrete **12. SITE SURVEYING AND PLANNING** Introduction, Site Surveying, Site Analysis, Detailed Analysis And Techniques, Site Planning And Site Layout Principles.

				13. PROFESSIONAL PRACTICE AND ETHICS I& II Introduction To The Architectural Profession, Professional Ethics And Code Of Conduct, Architect's Services & Scale Of Fees, Architectural Competitions, Legal Aspects & Legislation. Tender, Contract & Arbitration, New Trends In Project Formulation And Execution, Implications Of Globalisation In Architectural Practice, Emerging Specialisations For An Architect **14. ARCHITECTURAL ACOUSTICS** Fundamentals, Sound Transmission And Absorption, Noise Control And Sound Absorption, Constructional Measures, Acoustics And Building Design **15. ARCHITECTURAL DETAILING** Introduction To Current Developments In Building Industry, Detailing Of Walls, Roofs And Flooring For Institutional Buildings, Detailing Of Walls, Roof, Flooring For Commercial Buildings, Detailing Of Built-In Furniture And Fittings, Detailing Of Exterior And Interior Architectural Elements **16. SPECIFICATIONS AND ESTIMATION** Specification, Specification Writing, Estimation, Detailed Estimate, Cost Estimating & Cost Budgeting **17. HUMAN SETTLEMENT PLANNING** Introduction, Forms of Human Settlements, Planning Concepts, Urban Planning, Urban Renewal And Regional Planning **18. URBAN DESIGN** Introduction To Urban Design, Historic Urban Form, Theorising And Reading Urban Space, Issues Of Urban Space, Best Practice In Urban Design **19. VERNACULAR ARCHITECTURE** Introduction, Approaches And Concepts, Vernacular Architecture Of The Western Northern Region Of India, Vernacular Architecture Of South India, Western Influences On Venracular Architecture Of India **20. INTERIOR DESIGN** Introduction To Interior Design, History Of Interior And Furniture Design, Components Of Interior Space- Interior Treatment And Finishes, Components Of Interior Space- Lighting And Landscaping, Components Of Interior Space- - Furniture 21. **STRUCTURE AND ARCHITECTURE** History Of Structural Design In The Pre-Industrial Era, History Of Structural Design In The Post Industrial Period, Contemporary Structural Expression Through Case Study – I, Contemporary Structural Expression Through Case Study – II

				22. ENERGY EFFICIENT ARCHITECTURE Architecture And Energy, Solar Passive Architecture, Passive Heating, Passive Cooling, Day Lighting And Natural Ventilation **23. INDUSTRIAL BUILDING SYSTEM** Introduction, Application Of Industrial Building System, Modular Co-Ordination And Industrialised System, Pre-Fabrication System, Procedures And Organisation **24. ART APPRECIATION** Introduction To Art, Vocabulary Of Art, Appreciating Art – Beginnings To Modern Art, Appreciating Art- Modern Art And After, Appreciating Art- Indian Art **25. URBAN HOUSING** Introduction To Housing And Housing Issues – Indian Context, Socio-Economic Aspects, Housing Standards, Site Planning And Housing Design, Housing Process **26. SUSTAINABLE PLANNING AND ARCHITECTURE** Concept of Sustainability – Carrying capacity, sustainable development – Bruntland report – Ethics and Visions of sustainability, Eco system and food chain, natural cycles – Ecological foot print – Climate change and Sustainability, Selection of materials Eco building materials and construction – Biomimicry, Low impact construction, and recyclable products and embodied energy. Life cycle analysis. Energy sources – Renewable and non-renewable energy, Green building design – Rating system –LEED, GRIHA, BREEAM etc., case Studies, Urban ecology, social and economic dimensions of sustainability, urban heat Island effects, sustainable communities – Case studies. **27. PRINCIPLES OF TRADITIONAL INDIAN ARCHITECTURE** Introduction, Measurement And Resonance To Vibration, Site Planning And Cosmogram, Components And Detailing, Materials And Construction **28. COMPUTER APPLICATIONS IN ARCHITECTURE** Video Editing, Image Editing & Vector Editing, Pixel And Vector Animation, Web, Non Linear Presentation (Flash & Director) **29. CONSTRUCTION TECHNOLOGY** General Building Requirements, Construction Systems, Construction Practice, Construction Equipment, Construction Management

				30. EARTHQUAKE RESISTANT ARCHITECTURE Fundamentals of earthquakes, Site planning, performance of ground and buildings, Seismic design codes and building configuration, various types of construction details, Urban planning and design **31. ARCHITECTURAL CONSERVATION** Introduction to Conservation, Conservation In India, Conservation Practice, Urban Conservation, Conservation Planning **32. SAFETY SYSTEMS AND BUILDING MANAGEMENT** Safety Requirements, Fire Alarm Systems, Fire Suppression Systems: Security Systems, Integrated Building Management System **33. LANDSCAPE AND ECOLOGY** Introduction, Elements In Landscape Design, Garden Design Site Planning, Landscaping Of Functional Areas **SYLLABUS FOR PLANNING ASSISTANT (PLANNING STREAM)** 1. **BASICS OF STRUCTURAL DESIGN:** Compression and Tension, Columns and Walls, Shear Force and Bending Moment Diagrams, Principles of Design of Structures 2. **MATERIALS AND PRINCIPLES OF CONSTRUCTION:** Introduction to Building Materials and Finishes, Structural Uses of Timber, Principles of Construction of Building Elements, Site Development and Layouts, Principles on of Service Lines and Networks 3. **STATISTICAL METHODS-I& II :** Introduction, Data Presentation, Statistical Methods, Correlation, Probability, Sampling Distribution, Linear Regression Analysis, Time Series, Index Number, Estimation and Testing of Hypothesis, Large Sample Test, Chi-Square Test 4. **SURVEYING, PHOTOGRAMMETRY AND PHOTOGRAPHY:** Basic Principles and Chain Surveying, Traversing and Plain Table Surveying, Computation of Areas and Levelling, Photogrammetry, Photography 5. **HISTORY OF ART AND CULTURE OF SETTLEMENTS:** Art, Culture and Architecture of Old Civilization, Development of Building Technology, Revolutions and their Influences on Culture, Art and Its development, New' Art Forms and Techniques 6. **APPLIED GEOLOGY**: Introductory Earth Science and Meteorology, Geological Structure, Land Forms, Weathering, Landslides and Mass Wasting, Earthquake, Selection of Site and Foundations, Ground Water 7. **THEORY OF DESIGN:** Forms, Design, Perception, Building Elements, Architecture,

				8. **ARTS AND GRAPHICS-II:** Basic Design, Standard Presentation Format, Presentation Drawings and Communication Skills, Sculpture and Modelling, Mural Painting 9. **EVOLUTION OF HUMAN SETTLEMENTS:** Introduction, Planning Elements and Dimensions, Planning Through the Ages, The Modern City, Synthesis, 10. **PLANNING THEORY- I&II**: Concept Formation and Perception of Space, What is Planning, Physical Planning, Process of Planning, Plan Preparation and implementation Agencies. Urban Structure and Growth, Land Use Planning, Types of Planning, Principles of Regional Planning, Regional Planning in India. 11. **TECHNIQUES OF PLANNING· I&II :** Techniques of Preparing Base Maps, Data Base for Planning and Socio - Economic Surveys, Physical Surveys, Techniques of Presenting and Analysing Data. Planning Practice in India, Spatial Standards, Regional Survey, Plan Preparation Techniques, Introduction to Advanced Techniques 12. **ECOLOGY AND RESOURCE MANAGEMENT :**Introduction, Ecosystem and its Relevance to Environment, Quantitative Ecology, Environmental Impact Studies, 13. **TRAFFIC AND TRANSPORTATION PLANNING – I& II:** Urbanisation and Transport Problem, Urban and Regional Road Design, Surveys and Studies, Geometric Design of Roads and Intersections, Traffic Management. Evaluation of Urban Structures, Planning and Management of Transport System, Regional Transport Systems, Transport and Environment, Economic Evaluation and Transport Policies 14. **QUANTITY SURVEYING AND SPECIFICATIONS:** Specification, Specifications for Infrastructure Work, Specifications for External Work, Estimation, -Development Costs of Planning Schemes as per Standards, Norms 15. **ENVIRONMENTAL SCIENCE:** Environmental Disruptions, Solid Waste Management, Forest Resources, Environmental Problems, 16. **ELEMENTS OF ECONOMICS:** Definition and Scope of Economics, Theory of Demand and Supply, Theory of Firm and Production, Concept of Income, Employment and Money, Introduction to Urban and Regional Economics 17. **UTILITIES AND SERVICES PLANNING :**Introduction, Basic Concepts and Theories, Storm Water System, Sanitation and Sewer System, Water Supply System, Solid Waste Disposal, 18. **DEMOGRAPHY AND URBANISATION:** Study of Population, Study of Demography, World Urbanisation and Urbanisation in India, Settlement System and Role of Urban Area, Policies and Strategies for Directing Urbanisation Trends in India 19. **HOUSING AND COMMUNITY PLANNING:** Housing as a Basic Human Necessity, Role of Community Development in Housing, Housing Standards, Planning and Design of Housing Areas, Housing and Finance Policies 20. **SETTLEMENT GEOGRAPHY:** Introduction of Settlement Geography, Classification of Settlements, Rural Settlements, Urban Settlements,

				Settlements as a System 21. **DEVELOPMENT PLANNING:** Developed, Developing and Under-Developed Economics", Classical Theories of Development:·, Modern Theories of Development ,, Models of Development, Issues in Growth and Development 22. **URBAN DESIGN AND CONSERVATION:** Introduction to Urban Design Theory, Elements of Urban Design, Physical and Non-Physical Determinants of Urban Forms, Basic Principles of Conservation, Aspects of Urban Conservation, 23. **OPERATIONS RESEARCH AND SYSTEMS ANALYSIS/ COMPUTER** **APPLICATION:** Linear Programming Problems, Transportation Problems, Queuing systems, PERT and CPM Networks, System Simulation 24. **PLANNING AND MANAGEMENT OF INFORMAL SECTOR AND BASIC** **NEEDS.:** Urban Poverty, Basic Needs, Alternative Approaches ~or Delivery of Basic Services to the Urban Poor, Migratory Impulses and Impact on Informal Sector, Consequences of Spontaneous Growth, 25. **LANDSCAPE PLANNING AND DESIGN: l**andscape Elements, Urban Landscape, Landscape Aspects of Site Planning- I, Landscape Aspects of Site Planning- II, Elements of Landscape Planning,, 26. **LAND ECONOMICS AND LOCATIONAL THEORY:** Introduction to land Economics, Development of Land and Real Property, Real Property Markets, Factors Influencing Locational Decisions, Technique of Cost Benefit Analysis 27. **ELEMENTS OF SETTLEMENT SOCIOLOGY:** Introduction, Basic Concepts of Society, Sociology of India, Urban and Industrial Sociology, Neighborhood Concept 28. **RURAL AND RESOURCE PLANNING:** Introduction, Village Planning : Concepts and Institutional Framework, Rural Planning in Relation to National and Regional Policies, Resource Planning Development and Management, Community Development and Participation 29. **PLANNING INFORMATION SYSTEMS AND COMPUTER USE:** Introduction, Information Systems, Geographic Information System, Use Map, Other Packages 30. **URBAN MANAGEMENT:** Introduction to Management, Legal Framework, Urban Management, Organisations Involved in Urban Management, Coordination of Participation 31. **PROJECT PLANNING AND CONTROL:** Introduction to Project Management, Project Planning Management, Pre-Implementation Planning Phase, Project Implementation and Evaluation Phase, 32. **PUBLIC FINANCE:** Taxation, Fees and Charges, Borrowing, lnter-Governmental Fiscal Relations, Public Expenditure 33. **PROFESSIONAL PRACTICE:** Organisation, Scope and Scale of Charges, Role of Planner, Valuation, Methods of Real Property Valuation, Contract Documents and Project Formulation,

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<td>34. PLANNING LEGISLATION: Concept of Law, Indian Constitution, Land Acquisition Act, Case Studies Related to Land Acquisition Act., Organisations for Plan Implementation,
35. POLITICAL SYSTEMS AND PLANNING: Decision Making, Leadership, Communication, Political Systems, Social Systems and Planning, Conflicts.</td>
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<td>3</td>
<td>Andaman Public Work Department</td>
<td>(C) District Industries Centre</td>
<td>Industries Promotion Officer (Chemical)</td>
<td>
<u>Scheme of Examination:-</u>
<table>
<tr><th>Sl. No</th><th>Subject</th><th>No. of Questions(each question Shall carry one mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>General Studies (Section-I)</td><td>50</td><td>50</td></tr>
<tr><td>II</td><td>Subject Paper (Section-II)</td><td>100</td><td>100</td></tr>
<tr><td colspan="2">Total</td><td>150</td><td>150</td></tr>
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<u>Department: District Industries Centre, Sri Vijaya Puram</u>

<u>‘SYLLABUS’ for the posts of Industries Promotion Officer (Chemical), Group ‘B’ Non-Gazetted.</u>

<u>Name of Post:-Industries Promotion Officer (Chemical)</u>
<table>
<tr><th>Sl. No</th><th>Subject</th></tr>
<tr><td>I</td><td>General Studies (Section-I)</td></tr>
<tr><td>II</td><td>Subject Paper (Section-II)</td></tr>
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				I. General Studies:- **a. General Intelligence & Reasoning**:-The test will include questions on similarities and differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observation, relationship concepts, figure classification, arithmetical number series, non-verbal series etc. The test will also include questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationships, arithmetical computations and other analytical functions. **b. English Language:** Questions in this test will be set to assess the knowledge of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms etc. There may also be questions based on comprehension of a passage. **c. General Awareness:-** Questions will be designed to test the ability of the candidate's general awareness of the environment around him and its application to the society. Questions will also be designed to test knowledge of current affairs, observations/experience and elementary knowledge of computers. The test will also include questions relating to India and other countries especially, pertaining to History, Culture, Geography, Economics, Science, General Politics and Scientific Research etc. **II. Subject Paper(Degree/Diploma Level)** **Subjects as per RR: Degree/Diploma in Chemical Engineering.** **1. Engineering Mathematics**: Linear Algebra*:* Matrix algebra, Systems of linear equations, Eigen values and eigenvectors. Calculus*:* Functions of single variable, Limit, continuity and differentiability, Taylor series, Mean value theorems, Evaluation of definite and improper integrals, Partial derivatives, Total derivative, Maxima and minima, Gradient, Divergence and Curl, Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems. Differential Equations*:* First order equations (linear and nonlinear), Higher order linear differential equations with constant coefficients, Cauchy's and Euler's equations, Initial and boundary value problems, Laplace transforms, Solutions of one-dimensional heat and wave equations and Laplace equation. Complex Variables*:* Complex number, polar form of complex number, triangle inequality. Probability and Statistics*:* Definitions of probability and sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Poisson, Normal and Binomial distributions, linear regression analysis. Numerical Methods*:* Numerical solutions of linear and non-linear algebraic equations. Integration by trapezoidal and Simpson's rule. Single and multi-step methods for numerical solution of differential equations.

				2. Process Calculations and Thermodynamics: Steady and unsteady state mass and energy balances including multiphase, multi-component, reacting and non-reacting systems. Use of tie components; recycle, bypass and purge calculations; Gibb's phase rule and degree of freedom analysis. First and Second laws of thermodynamics. Applications of first law to close and open systems. Second law and Entropy. Thermodynamic properties of pure substances: Equation of State and residual properties, properties of mixtures: partial molar properties, fugacity, excess properties and activity coefficients; phase equilibria: predicting VLE of systems; chemical reaction equilibrium. **3. Fluid Mechanics and Mechanical Operations:** Fluid statics, surface tension, Newtonian and non-Newtonian fluids, transport properties, shell balances including differential form of Bernoulli equation and energy balance, equation of continuity, equation of motion, equation of mechanical energy, Macroscopic friction factors, dimensional analysis and similitude, flow through pipeline systems, velocity profiles, flow meters, pumps and compressors, elementary boundary layer theory, flow past immersed bodies including packed and fluidized beds, Turbulent flow: fluctuating velocity, universal velocity profile and pressure drop. Particle size and shape, particle size distribution, size reduction and classification of solid particles; free and hindered settling; centrifuge and cyclones; thickening and classification, filtration, agitation and mixing; conveying of solids. **4. Heat Transfer:** Equation of energy, steady and unsteady heat conduction, convection and radiation, thermal boundary layer and heat transfer coefficients, boiling, condensation and evaporation; types of heat exchangers and evaporators and their process calculations; design of double pipe, shell and tube heat exchangers, and single and multiple effect evaporators. **5. Mass Transfer:** Fick's laws, molecular diffusion in fluids, mass transfer coefficients, film, penetration and surface renewal theories; momentum, heat and mass transfer analogies; stage-wise and continuous contacting and stage efficiencies; HTU & NTU concepts; design and operation of equipment for distillation, absorption, leaching, liquid-liquid extraction, drying, humidification, dehumidification and adsorption, membrane separations(micro-filtration, ultra-filtration, nano-filtration and reverse osmosis). **6. Chemical Reaction Engineering:** Theories of reaction rates; kinetics of homogeneous reactions, interpretation of kinetic data, single and multiple reactions in ideal

reactors, kinetics of enzyme reactions (Michaelis-Mentenand Monod models), non-ideal reactors; residence time distribution, single parameter model; non-isothermal reactors; kinetics of heterogeneous catalytic reactions; diffusion effects in catalysis; rate and performance equations for catalyst deactivation.

7. Instrumentation and Process Control:

Measurement of process variables; sensors and transducers; P&ID equipment symbols; process modelling and linearization, transfer functions and dynamic responses of various systems, systems with inverse response, process reaction curve, controller modes (P, PI, and PID); control valves; transducer dynamics; analysis of closed loop systems including stability, frequency response, controller tuning, cascade and feed forward control.

8. Plant Design and Economics:

Principles of process economics and cost estimation including depreciation and total annualized cost, cost indices, rate of return, payback period, discounted cash flow, optimization in process design and sizing of chemical engineering equipment's such as heat exchangers and multistage contactors.

9. Chemical Technology:

Inorganic chemical industries (sulfuric acid, phosphoric acid, chlor-alkali industry), fertilizers (Ammonia, Urea, SSP and TSP); natural products industries (Pulp and Paper, Sugar, Oil, and Fats); petroleum refining and petrochemicals; polymerization industries (polyethylene, polypropylene, PVC and polyester synthetic fibers).

4	Andaman Adim Janjati Vikas Samiti	(D)Andaman Adim Janjati Vikas Samiti	Tribal Welfare Officer	**Scheme of Examination:-**

Sl. No	Subject	No. of Questions(each question Shall carry one mark)	Maximum Marks
I	Anthropology/Sociology/ Social Work.	100	100
II	English Language	25	25
III	Numerical Aptitude	25	25
IV	General awareness & General Intelligence Reasoning	50	50
Total		200	200

				Subject Matter	Anthropology	The question focuses on the candidates' ability to understand the subject as science and apply the knowledge to problems faced by the people. The topics included in this subject are related to human evolution, social structures, cultural evolution and development, Science of human behavior and social being, Socio-cultural, Biological, Linguistic and Archaeological Science
					Sociology	Applied Sociology, Comparative Sociology, Cultural Sociology, Collective Behavior, Crime and Delinquency, Community and Demography, symbolic interactionism theory, social conflict theory, structural-functional theory, and feminist theory, social stratification, social class, social mobility, religion, secularization, law, sexuality, gender and deviance
					Social Work	Social Science, Social Work Administration, Life Skills, Health and Nutrition, Awareness on Disabilities, Education, and Development, Psychology, Community Organization, Physical, Mental and Community Health, family education, intervention with communities and institutions, substance abuse, counseling, social problems and services, empowerment of women, Relevance of Psychology in Social Work, Contemporary Social Problems & Social Defense, Role of NGOs.
				General Aptitude	English Language	Questions in this test will be set to assess the knowledge of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms etc. There may also be questions based on comprehension of a passage.
					Numerical Aptitude	Questions will be designed to test the ability of arithmetical computation of whole numbers, decimal and fraction and relationship between numbers. This test will also include question on problems relating to percentage, ratios and proportions, average estimation, use of table and graphs, mensuration, time and distance, ratio and time etc.
					General Awareness and General Intelligence & Reasoning	Questions will be designed to test the ability of the candidate's general awareness of the environment around him and its application to the society. Questions will also be designed to test knowledge of current affairs, observations/experience and elementary knowledge of computers. The test will also include questions relating to India and other countries especially, pertaining to History, Culture, Geography, Economics, Science, General Politics and Scientific Research etc. The test will includes questions on similarities and difference, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observations, relationship, concepts, figure

<table>
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<tr><td></td><td></td><td>classification, arithmetical number series, non-verbal series to test. The test will also include questions design to test the candidates abilities to deal with abstract ideas and symbol and their relationship, arithmetical computation and other analytical functions</td></tr>
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</td></tr>
<tr><td>5</td><td>Directorate of Fisheries</td><td>(E) Directorate of Fisheries</td><td>Assistant Fisheries Development Officer</td><td>
<u>Scheme of Examination:-</u>
<table>
<tr><th>Sl. No</th><th>Subject</th><th>No. of Questions(each question Shall carry one mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>General Awareness</td><td>20</td><td>20</td></tr>
<tr><td>II</td><td>English Language</td><td>20</td><td>20</td></tr>
<tr><td>III</td><td>Subject Paper</td><td>80</td><td>80</td></tr>
<tr><td colspan="2">Total</td><td>120</td><td>120</td></tr>
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(Total Marks - 80)

1. Non-Chordata: Six (06) marks
General organisation - Classification with diagnostic features upto classes. Evolutionary relationship among taxa, symmetry.

Protozoa: Structure, reproduction and life history of Amoeba, Paramecium, Trypanosoma, Plasmodium, Monocystis, Leishmania - locomotion, nutrition, economic importance. Porifera:

Sponges canal system, skeleton, reproduction and economic importance.

Coelenterata: Diploblastic organization - life history of obelia and Aurelia, Metagenesis - Polymorphism in Hydrozoa. Corals and Coral formation - relationships of Cnidaria and Acnidaria.

Helminthes: Structure and life history of Planaria, Fasciola, Teania, Ascaris and Wucheriria - parasitic adaptations - Helminthes in relation to man.

Annelida: Nereis, earthworm and leech - Coelom and metamerism - modes of life in polychactes.Onychophora: Structure, affinities and distribution of Peripatus.
</td></tr>
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				Arthropoda: Prawn, Scorpion and Cockroach - Larval forms and parasitism in Crustacea - Mouth parts, vision, respiration and excretion. Metamorphosis and social life in insects. **Mollusca**: Freshwater mussel, pila, sepia. Echinodermata: General organisation - Water vascular system. Larval forms and affinities. 2. **Chordata: Six (06) marks** **Prochordata**: Amphioxus, Balanoglossus - Ascidian retrogressive Metamorphosis, neoteny and affinities. **Chordata**: General Organisation - Characters, Outline, classification upto class level. **Pisces**: Locomotion, migration, respiration, Parental care, economic importance; structure and affinities of dipnoi. **Amphibia**: Origin of amphibians - Respiration, Parental care - South Indian amphibians. **Reptiles**: Origin - Conquest of land - adaptations to live on land, adaptive radiation -emporal Vacuities - identification of poisonous and non-poisonous snakes - poison apparatus - South Indian snakes. **Birds**: Origin - flight adaptations - mechanism of flight - double respiration - migration - Flightless birds. **Mammals**: Dentition, skin derivatives - distribution - adaptive radiation. Protothria, Metatheria, eutheria and their Phylogenetic relationships. 3. **Fishery Resources and General Fish Biology: Six(06) marks** Capture fishery resource of India - Major Riverine fisheries of India - Lake Fisheries Reservoir Fisheries - Cold Water Fisheries - Pollution in Inland Waters. Principal Marine Fisheries of Indian Coasts-Crustacean fishery resources-Shrimps, lobsters-Molluscan resources-Gastropods, Bivalves- Sea weed Resources -Maximum Sustainable Yield-Distribution of living organisms in the Sea. Classification of fishes - Morphometric and Meristic Characters - Length weight Relationship- Food and Feeding Habits - Reproductive Biology- Fish Physiology - Developmental Biology of Fin Fish, Shell fish. *4.* ***Mari Culture, Seaweed and Aquaculture:*** **Six (07) marks**

				Site selection for fish culture- construction of fish farms - cultivable fishes for fresh water and brackish water - culture techniques, monoculture, composite fish culture, - pre-stocking and post/stocking management - integrated fish farming - polyculture -Pond chemistry - Dissolved Oxygen - Alkalinity, Hardness aquaculture, fish feeds - Pond disinfection with lime - Water quality management, integrated fish farming - sewage - fed fish culture - Shrimp culture - shrimp feed formulation - shrimp hatchery and nursery rearing- culture techniques of bivalves. - Role of cage and pen culture in enhancement of fish production from reservoirs **Mari culture**- candidate species for Mariculture - Open water cages - Emerging trends in farming in open seas **Seaweed** species of commercial importance - Culture methods - Open sea culture - Integrated farming systems - Integrated mariculture systems - Marine integrated multitrophic aquaculture(MIMTA) - Products of commercial importance from seaweeds - Emerging trends in farming in open seas. **Ornamental fish culture** - Important Ornamental fishes of India - Live bearers -Egg layers-breeding and Culture of Ornamental Fishes - culture of Fish food organisms- aquarium Keeping. 5. **Fishing Craft, Gear, Navigation and Seamanship: Six (06) marks** Classification of Fishing Gear - Fishing Gear Materials -Modern Fishing gears - Trawls, Gill, Nets, Longlines Fishing Gear Accessories - Fishing Crafts of Indian Coast - Wooden boat construction - Steel boat construction - FRP boat Construction-Dry docking- Boat building yards- squid jigger;Electronic equipment- echo sounder, SONAR, RADAR, Radio telephone & GPS. Principles of navigation and seamanship- Compass, GPS-EPIRB- Rules of road related to fishing vessels - navigational lights-- life saving devices - weather warning signals- International code flags-buoyage system, storm signals, distress signals. 6. **Fish in Nutrition, Fish Products & By products and value addition:** **Six (06) marks** Nutritional value of fish protein, non -protein, nitrogen, lipid, minerals, micro and macro element, trace elements, other functional biomolecules)- Fish Valued added products: fermented fish products, Fish sausage, Extruded products, battered and breaded products; Fishery by products and fish waste utilization: fish hydrolysate, Fish Protein Concentrate, fish ensilage, fish maws, isinglass, shark fin rays, fish gelatin- Fish meal- fish oil- -fish protein concentrate- fish hydrolysate- fish silage - fish mays, fish glue- gelatin-isinglass and shrimp waste- chitin -chitosan.

				7. **Fish Harvest and Post-harvest (Preservation and Processing):** **Six (07) marks** Hygienic handling of fish -freshness testing- Rigor Mortis - -Freshness of fish and rigor mortis - mechanisms of fish spoilage - fish drying methods - principles of salting and salt curing methods - smoking of fishes.Canning materials - canning media - methods of canning - quality of canned fishery products.Spoilage of canned foods, types, causes and preventive measures-packaging materials for canned foods.Fish preservation by chilling and icing - preparation of ice-chemicals used in freezing - types of freezing changes during frozen storage- method of thawing. Microbiological and biochemical changes in freezing - packaging and transport of frozen fishery products - freeze drying. 8. **Fish and Shrimp Diseases:** **Six (06) marks** Fish diseases - fish parasites -Bacterial and viral diseases-remedial measures. Shrimp Diseases - Types-Causes- Diagnostics methods - Prevention and treatment - Health management. 9. **Fisheries Marketing, Economics & Extension:** **Six (06) marks** Economics of marine capture fisheries and fish production systems -domestic and export marketing - marketing channel, export and import policies-Contribution of fisheries to GDP-marine fishery regulations - importance of cooperatives fishermen associations, NGOs and SHGs in fisheries development - Fisheries Co -management - types of primary and secondary data for statistical analysis for policy making - fisheries investment projects, finance and project planning - socio-economics of fisherfolk. Fisheries extension methods-ICT and Administration- Extension service for fisheries development- Important fisheries development schemes and organizations - training and follow up programmes- entrepreneurship development. Ecosystem approach for fisheries management -BEZ-Marine fisheries regulations. 10. **Navigation and Seamanship:** **Six (06) marks** Fire fighting and lifesaving appliances, Electronic navigation and communication aids, International laws and agreements of the sea. 11. **Aquatic Environment Management:** **Six (06) marks** Marine, freshwater and brackish water environments. Water quality parameters, limnology, waves and tides.Water masses, winds, clouds, ocean currents, migration of fishes, biodiversity indices, mangroves, sea grasses, aquatic flora and fauna of ecological significance. Aquatic pollution and mitigation.

				12. **Fisheries Statistics**: **Six (06) marks** Probability, random variable, concepts of Binomial, Poison and Normal distributions and their use in fisheries. Basic concept of sampling distribution; standard error and central limit theorem, tests of significance based on normal, t, chi-square and F distributions. Relation between correlation and regression, Length weight relationship in fishes; applications of linear regression in fisheries. Methodology for estimation of marine fish landings in India, Estimation of inland fish production in India and problems encountered. 13. **Fisheries Administration and Legislation: Six (06) marks** Fisheries and aquaculture legislations at Central and State level; Development and regulatory activities of Central, State and Local government in aquaculture and fisheries; Functions and powers of functionaries under fisheries administration; Different central and state level fisheries institutions; Principles of organization and management of public enterprise. Fisheries development over five year plans; International fisheries organizations. Schemes and incentives for promotion of entrepreneurship in fisheries sector. Government policy on small and medium Enterprises (SMEs/SSIs. Export and import Policies relevant to fisheries sector. Fisheries plans and programmes by Government. Note :- **As per the existing Recruitment Rules dated 03.03.2011 and subsequent amendment dated 31.08.2017. The Essential Educational Qualifications and experience required for Group-B Non-Gazetted (Pay Level - 6) post of Assistant Fisheries Development Officer is :-**

6	Directorate of RD, PRIs & Urban Local Bodies	(F) Directorate of RD, PRIs & Urban Local Bodies	Panchayat Secretary	**Scheme of Examination:-**
7	Directorate of RD, PRIs & Urban Local Bodies	(G) Directorate of RD, PRIs & Urban Local Bodies	Extension Officer	
8	Directorate of RD, PRIs & Urban Local Bodies	(H) Chief Pay And Accounts Office	Accountant	
9	Directorate of RD, PRIs & Urban Local Bodies	(I) Directorate of Civil Supplies & Consumer Affairs	Civil Supplies Inspector	

SUBJECT	Number of questions/Marks		TIME ALLOWED	TIMINGS
Part-A : English Language	40	**120 marks**	**2(two) hours**	**10.00 AM to 12.00 NOON**
Part-B : General Awareness	40			
Part-C: Test of Reasoning	20			
Part-D: Numerical Aptitude	20			

There will be negative marking of 25% for each wrong answer, meaning thereby 0.25 marks will be deducted for each wrong answer. The qualifying marks for each paper shall be as under:

Question Paper	Qualifying Marks
Question Paper (which includes English Language, General Awareness, Test of Reasoning and Numerical Aptitude)	35% marks in aggregate for Physically Handicapped (Orthopedically Handicapped) and 40% marks in aggregate for all other candidates.

SYLLABUS

Syllabus: Paper-I:

Part-A – English Language : Questions in the test will be based on error recognition, fill in the blanks (using verbs, prepositions, articles etc.) vocabulary, spelling, sequence of sentences in a paragraph, sequence of words in a sentence, cloze passage and comprehension passage etc. synonyms and antonyms will be asked in the context of the given passage.

10	Directorate of RD, PRIs & Urban Local Bodies	(J) ANIIDCO	Junior Assistant	**Part-B – General Awareness:** Questions in this test will aim at measuring knowledge of current events besides knowledge of General Science / Social Science and their application to the society. This test will also include questions on sports, culture, history, geography, general polity etc. These questions will be such that they do not require a special study of any discipline. **Part-C- Test of Reasoning:** The test will include questions on analogies, similarities and differences, space visualization, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning, arithmetical number series, non-verbal series, etc. The test will also include questions designed to test the candidates abilities to deal with abstract ideas and symbols and their relationship, arithmetical computations and other analytical functions. **Part-D- Numerical Aptitude:** The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be the computation of whole numbers, decimals and fractions and relationships between numbers. It will test sense of order among numbers, ability to translate from one name to another, sense or order of magnitude, estimation or prediction of the outcome of computation, selection of an appropriate operation for the solution of real life problems and knowledge of alternative computation procedures to find answers. The questions would also be based on arithmetical concepts and relationship between numbers and not on complicated arithmetical computation.
11	Directorate of RD, PRIs & Urban Local Bodies	(K) IP&T (Tourism Division)	Receptionist	
12	Directorate of RD, PRIs & Urban Local Bodies	(L) RCS, Sri Vijaya Puram	Inspector of Cooperative Societies.	
13	Directorate of RD, PRIs & Urban Local Bodies	(M) RCS, Sri Vijaya Puram	Sub- Inspector of Cooperative Societies.	
14	Directorate of RD, PRIs & Urban Local Bodies	(N) Govt. Press	Senior Reader	

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<tr>
<td>15</td>
<td>Directorate of Social Welfare</td>
<td>(O)
Directorate of Social Welfare</td>
<td>Mukhya Sevika</td>
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<u>Scheme:</u>
<table>
<tr><th>Sl. No</th><th>Subject</th><th>No. of Questions(each question Shall carry one mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>Subject Paper</td><td>70</td><td>70</td></tr>
<tr><td>II</td><td>General Knowledge & Current Affairs</td><td>20</td><td>20</td></tr>
<tr><td>III</td><td>General English</td><td>10</td><td>10</td></tr>
<tr><td colspan="2">Total</td><td>100</td><td>100</td></tr>
</table>
1. Subject Paper (70 Marks)
a) Nutrition
b) General Health & Hygiene
c) Early Childhood care & education
d) Immunization & Infant feeding
e) Community organization
f) Growth monitoring
2. General Knowledge & Current Affairs (20 Marks)
3. General English (10 Marks)
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<tr><td>16</td><td>Directorate of Transport</td><td>(P)
Directorate of Transport</td><td>Junior Engineer</td><td rowspan="2"><u>Scheme of Examination:-</u>

<table><tr><th>Sl. No</th><th>Subject</th><th>No. of Questions(each question Shall carry one mark)</th><th>Maximum Marks</th></tr><tr><td>I</td><td>General Aptitude</td><td>40</td><td>40</td></tr><tr><td>II</td><td>Technical Aptitude</td><td>60</td><td>60</td></tr><tr><td colspan="2">Total</td><td>100</td><td>100</td></tr></table>
<u>Syllabus for the post of Junior Engineer and Chargeman.</u>

Maximum Marks – 100

(40 marks each for General Aptitude and 60 marks for Technical Aptitude)

A. <u>General Aptitude- 40 Marks</u>

(i) General Intelligence & Reasoning: The test will include questions on similarities and differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observation, relationship concepts, figure classification, arithmetical number series, non-verbal series etc. The test will also include questions designed to test the candidate’s abilities to deal with abstract ideas and symbols and their relationships, arithmetical computations and other analytical functions.
(ii) Numerical Aptitude: Questions will be designed to test the ability of arithmetical computation of whole numbers, decimal and fraction and relationship between numbers. This test will also includes question on problems relating to percentage, ratios and proportions, average estimation, use of table and graphs, mensuration, time and distance, ratio and time etc.
(iii) English Language: Questions in this test will be set to assess the knowledge of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms etc. There may also be questions based on comprehension of a passage.
(iv) General Awareness: Questions will be designed to test the ability of the candidate’s general awareness of the environment around him and its application to the society. Questions will also be designed to test knowledge of current affairs, observations/ experience and elementary</td></tr>
<tr><td>17</td><td>Directorate of Transport</td><td>(Q)
Directorate of Transport</td><td>Chargeman</td></tr>
</table>

				knowledge of computers. The test will also include questions relating to India and other countries especially, pertaining to History, Culture, Geography, Economics, Science, General Politics and Scientific Research etc. ***<u>B. Technical Aptitude-60 Marks</u>*** **<u>Automobile Engineering</u>** **I. Introduction to Automobiles:** Classification of automobile vehicles, types of automobile vehicles. Types of automobile power plants. **1. Transmission Systems:** Need and Requirements and its components and their functions. Clutch, Gear box, propeller shaft, Differential, Axles. **2. Control Systems:** Steering, Braking System. **3. Suspension Systems, Wheels and Tyres:** Necessity and Classification of Suspension Systems; Wheels and Tyres. **4. Electrical Systems and Automobile Air conditioning System:** Battery; Starting System; Lighting System; Ignition System and their Components. Electrical systems, working principle of various components, ignition systems, alternators, automotive lighting, accessories and dashboard instruments- head light and horn with relays. automotive air conditioning, Preventive and breakdown vehicle maintenance-engine testing, servicing-engine overhaul- engine tuning, I.C. Engine Testing and Pollution Control etc. **II. <u>Thermal Engineering</u>** **1. Fundamentals of Thermodynamics:** Concepts of pure substance, types of systems, properties of systems; Work, Heat Transfer and Energy; Law of Thermodynamics and their applications. **2. Ideal Gases:** Concept of Ideal gas; Ideal gas processes. **3. Steam and Steam Boiler:** Generation of steam, Properties of steam and use of steam table, Dryness fraction, Degree of superheat; Vapour processes; Steam Boiler; Boiler mountings and accessories. **4. Steam Nozzles and Turbines:** Steam nozzle; Steam turbine; Compounding and governing of turbines and its types. **5. Steam Condensers and Cooling Towers:** Dalton's law of partial pressure; Construction, working, function and classification of condensers; Sources of air leakage and its effect, concept of condenser efficiency, vacuum efficiency; Cooling Towers. **6. Heat Transfer:** Modes of heat transfer, Fourier's law, thermal conductivity; Radiation:- Thermal Radiation, absorptivity, Transmissivity; Heat Exchangers. **III. <u>Power Engineering</u>** **1. I.C. Engine:** Power Cycles; Classification and Application of I.C. Engines. **2. I.C. Engine Testing and Pollution Control:** Engine terminology, Engine Testing; List of fuel, lubricant additives and their advantages; Pollution Control.

				3. **Air Compressor:** Compressor terminology; Reciprocation Air Compressor; Rotary Compressor. **4.** **Gas Turbine and Jet Propulsion:** Classification and applications of gas turbine; Methods to improve thermal efficiency; Jet Propulsion. **5.** **Refrigeration and Air-Conditioning:** Refrigeration terminology and systems; Psychrometry; Air conditioning systems. **IV.** **Production Engineering and Manufacturing Technology** **1.** **Lathe Machine:** Basics, classification and basic parts of centre lathe & their functions, Lathe operations; Cutting tool nomenclature & tool signature, cutting parameters. **2.** **Drilling Machine:** Basics, classification, basic parts of drilling machine and their functions, twist drill nomenclature, drilling machine operations. **3.** **Milling & Gear Cutting: Milling:** Basics, classification, basic parts of milling machine & their functions: Standard milling cutters; milling operations; cutting parameters. **Gear Cutting:** Basics, gear manufacturing methods; universal dividing head & indexing methods; gear shaping & gear hobbling setup, working, advantages, disadvantages, applications, gear finishing methods. **4.** **Grinding:** Basics, Classifications, Grinding operations; Grinding wheel composition, types and shapes and selection criteria, grinding wheel dressing & truing; designations; safety precautions. **5.** **Super Finishing processes:** Method of surface finishing like honing, lapping, burnishing, polishing ad buffing – setup, advantages, limitations and applications. **6.** **Forming Process:** Drop forging; Rolling; Extrusion. **7.** **Press Working:** Press classification & operations; Die set components and types of dies; Forming Operations. **8.** **Casting Processes:** Pattern making; Moulding; Casting. **9.** **Welding:** Basics & classification of welding processes; Various welding operations; Soldering and brazing. **10.** **Plastic moulding methods:** Introduction, Properties & types of plastics, plastic moulding methods compression moulding, injection moulding, blow moulding, extrusion, vacuum forming and calendaring. **V.** **Material Science** **1.** **Engineering Materials – Structure and Properties:** Crystal structures, unit cell and space lattice, Concept of packing efficiency; Classification and properties of materials; Steels and Cast irons as alloys of iron and carbon. **2.** **Equilibrium Diagrams:** Concept of phase, pure metal, alloy and solid solutions; Solidification of pure metal and Alloys; Iron Carbon Equilibrium diagram.

				3. Heat Treatment of Steels: Transformation in steel on heating under equilibrium conditions; Annealing; Normalizing; Hardening; Tempering; Surface Heat Treatment. **4. Steels and Cast Irons:** Broad Classification of steels, Plain carbon steels, Alloy Steels; Cast Irons; Specifications of steels and cast Irons. **5. Non-ferrous Metals and Alloys:** Chemical compositions, properties and applications Copper alloys; Aluminium alloys; Bearing materials. **6. Non Metallic Materials:** Polymeric Materials; Thermoplastic and Thermosetting Plastic materials; Rubbers; Ceramics, Glasses, Glass Wool, Composite Materials, Nano materials. **7. Powder Metallurgy & Non-destructive Testing:** Powder Metallurgy; Non-destructive Testing. **VI. <u>Engineering Drawing</u>** Projection of Lines, curves and planes; Projection of Solids; Sections of Solids; Developments Surfaces; Sectional Orthographic and missing views; Free Hand Sketches of machine elements. **VII. <u>Strength of Materials</u>** **1. Mechanical Properties of Materials, Simple Stresses & Strains:** Mechanical properties and Concept of Simple stresses & strains; Composite section; Buckling of long colums. **2. Principal Stresses and Planes:** Concept of Principal stresses and Principal planes; Thin Cylindrical shell. **3. Bending Moment & Shear Force:** Concept & definition of Shear force & bending moment. **4. Moment of Inertia:** Concept & definition of Moment of inertia; Parallel & perpendicular axes theorem. **5. Bending Stresses:** Theory of simple bending; Concept of direct & transverse shear stress. **6. Direct and Bending Stresses:** Concept of Axial load, eccentric load, direct stresses, bending stresses, maximum & minimum stresses. **7. Torsion:** Concept of Pure Torsion; Solid and Hollow Shafts. **VIII. <u>Engineering Mechanics</u>** **1. Simple Machines:** Definitions; Analysis; Velocity Ratio for simple machines. **2. Force Systems:** Fundaments and Force Systems; Resolution of a force and Moment of a force. **3. Composition of Forces:** Analytical method; Graphical method. **4. Equilibrium:** Equilibrant and Lami's Theorem; Beams. **5. Friction:** Definition**;** Equilibrium of body on Horizontal and inclined plane. **6. Centroid and Centre of Gravity:** Centroid; Center of Gravity.

				IX. <u>Fluid Mechanics and Machinery</u> **1. Properties of Fluid and Fluid Pressure:** Properties of Fluid; Fluid Pressure Measurement. **2. Fluid Flow:** Types of fluid flows; Continuity equation; Bernoulli's theorem and their applications. **3. Flow Through Pipes:** Laws of fluid friction; Darcy's equation and Chezy's equation for frictional losses; Minor losses infittings and valves; Hydraulic gradient line and total energy line; Hydraulic power transmission through pipe. **4. Impact of Jets:** Impact of jet on fixed vertical, moving vertical flat plates, curved vanes with special reference to turbines and pumps. **5. Hydraulic Turbines:** Layout and features of hydroelectric power plant, surge tanks and its need; Classification and their applications; Construction and working principle of Pelton wheel, Francis and Kaplan turbine; Draft tubes; Concept of cavitation in turbines; Work done, Power, efficiency of turbine. **6. Pumps:** Centrifugal Pumps: Reciprocating Pump. **X. <u>Theory of Machines</u>** **1. Fundaments and type of Mechanisms:** Kinematics of Machines: Inversion of Kinematic Chain. **2. Velocity and Acceleration in Mechanisms:** Concept of relative velocity and relative acceleration of a point on a link, angular acceleration, inter-relation between liner and angular velocity and acceleration; Drawing of velocity and acceleration diagram of a given configuration, diagrams of simple Mechanism. **3. Cams and Followers:** Concept, definition and applications of Cams and Followers, their terminology and Classification; Different follower motions and their displacement diagrams; Drawings of cam profile. **4. Power Transmission:** Belt Drives; Chain Drives; Gear Drives. **5. Flywheel and Governors:** Flywheel; Governors; Comparison between Flywheel and Governor. **6. Brakes and Dynamometers:** Function, types and comparison of brakes and Dynamometers; Construction and working of brakes and Dynamometers; Braking force and braking torque and power for shoe and band brake. **7. Clutches and Bearings:** Function, types and construction of Clutches and Bearings. **8. Balancing:** Concept of balancing; Balancing of single rotating mass and several masses revolving in same plane. **XI. Motor Vehicle Laws:** 1. Motor Vehicle Act, 1988 2. Central Motor Vehicle Rules 1989 and Andaman and Nicobar Islands Motor Vehicle Rules(ANIMVR), 2006 Rules of Road Regulations, 2017

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<td>18</td>
<td>Directorate of Transport</td>
<td>(R) Directorate of Transport</td>
<td>Chief Inspector</td>
<td>

Scheme of Examination:-

<table>
<tr><th>Sl. No</th><th>Subject</th><th>No. of Questions(each question Shall carry one mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>General Intelligence & Reasoning</td><td>25</td><td>25</td></tr>
<tr><td>II</td><td>Numerical Aptitude</td><td>25</td><td>25</td></tr>
<tr><td>III</td><td>English Language</td><td>25</td><td>25</td></tr>
<tr><td>IV</td><td>General Awareness</td><td>25</td><td>25</td></tr>
<tr><td colspan="2">Total</td><td>100</td><td>100</td></tr>
</table>

Each wrong answer = (-) 0.25 (minus 0.25)

Syllabus for the post of Chief Inspector

(Maximum Marks – 100) - 50 Marks each (Timing – 2 Hours)

(i) **General Intelligence & Reasoning**: The test will include questions on similarities and differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observation, relationship concepts, figure classification, arithmetical number series, non-verbal series etc. The test will also include questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationships, arithmetical computations and other analytical functions.

(ii) **Numerical Aptitude**: Questions will be designed to test the ability of arithmetical computation of whole numbers, decimal and fraction and relationship between numbers. This test will also includes question on problems relating to percentage, ratios and proportions, average estimation, use of table and graphs, mensuration, time and distance, ratio and time etc.

(iii) **English Language**: Questions in this test will be set to assess the knowledge of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms etc. There may also be questions based on comprehension of a passage.

(iv) **General Awareness**: Questions will be designed to test the ability of the candidate's general awareness of the environment around him and its

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<tr><td></td><td></td><td></td><td></td><td>application to the society. Questions will also be designed to test knowledge of current affairs, observations/ experience and elementary knowledge of computers. The test will also include questions relating to India and other countries especially, pertaining to History, Culture, Geography, Economics, Science, General Politics and Scientific Research etc.</td></tr>
<tr><td>19</td><td>Directorate of Transport</td><td>(S) Office of Labour Commissioner & DET</td><td>Assistant Employment Officer</td><td>
<u>Scheme of Examination:-</u>
<table>
<tr><th>Sl. No</th><th>Subject</th><th>No. of Questions(each question Shall carry one mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>Concerned technical Subject</td><td>80</td><td>80</td></tr>
<tr><td>II</td><td>General Knowledge</td><td>20</td><td>20</td></tr>
<tr><td colspan="2">Total</td><td>100</td><td>100</td></tr>
</table>
Each wrong Answer (-) 0.25 (Minus 0.25)
<u>Part 1 - 80 Marks</u>
<u>COMMERCE</u>
a) Financial Accounting
b) Business Environment
c) Business Organisation And Management
d) Corporate Accounting
e) Marketing Management
f) Cost Accounting
g) Business Law: i)Indian Contract Act, 1872, ii) Negotiable Instruments Act, 1881
h) Income Tax and GST Laws
i) Principles & Practice Of Auditing
j)Financial Management
k) Indian Financial System
</td></tr>
</table>

				ECONOMICS a) Microeconomics b) Macroeconomics c) Growth and Development d) Indian Economy e) Public Finance f) International Economics g) Financial Economics h) Current Affairs and Reports **SOCIAL WORK** a) Foundations of Social Work & Social Welfare b) Human Behavior, Society & Social Problems c) Social Work Methods, Techniques & Intervention d) Social Policy, Labour &Employment Welfare e) Social Work Research, Statistics & Contemporary issues **PSYCHOLOGY** a) General Psychology b) Biological Psychology c) Cognitive Psychology d) Research Methodology & Statistics e) Psychological Testing f) Developmental Psychology g) Personality h) Social Psychology i) Clinical Psychology j) Health Psychology **STATISTICS** a) Introduction to Statistics

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<td>b) Measures of Central Tendency
c) Measures of Dispersion
d) Correlation and Regression
e) Probability and theoretical distributions
f) Sampling and Sampling Distribution
g) Index Numbers and Time Series
h) Statistical In ference (Basic level)
i) Presentation and Interpretation of data

<u>Part II (General Knowledge) - 20 Marks</u>

The General Knowledge of latest updates news and current affairs

<u>NOTE:</u> There will be negative marking of 0.25 marks for each wrong answer. Candidates are, therefore, advised to keep this in mind while answering the questions.
ZEBRONICS</td>
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<tr>
<td>20</td>
<td>Directorate of Transport</td>
<td>(T) District Industries Centre</td>
<td>Economical Investigator</td>
<td><u>Scheme of Examination:-</u>
<table>
<tr><th>Sl. No</th><th>Subject</th><th>No. of Questions(each question Shall carry one mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>General Studies (Section-I)</td><td>50</td><td>50</td></tr>
<tr><td>II</td><td>Subject Paper (Section-II)</td><td>50</td><td>50</td></tr>
<tr><td colspan="2">Total</td><td>100</td><td>100</td></tr>
</table>
I. <u>General Studies</u>:-50-Marks(Equal distribution to all Chapters)

a. General Intelligence & Reasoning:-The test will include questions on similarities and differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observation, relationship concepts, figure classification, arithmetical number series, non-verbal series etc. The test will also include questions designed to test the candidate’s abilities to deal with abstract ideas and symbols and their relationships, arithmetical computations and other analytical functions.</td>
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				b. **English Language:** Questions in this test will be set to assess the knowledge of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms etc. There may also be questions based on comprehension of a passage. **c.** **General Awareness:** Questions will be designed to test the ability of the candidate's general awareness of the environment around him and its application to the society. Questions will also be designed to test knowledge of current affairs, observations/experience and elementary knowledge of computers. The test will also include questions relating to India and other countries especially, pertaining to History, Culture, Geography, Economics, Science, General Politics and Scientific Research etc. **II. Subject Paper(Degree Level)** Maximum Marks on Subject: 50-Marks(Equal distribution to both the subjects) **Subjects as per RR: Degree in Economics/Commerce with Economics/Statistics from a recognized university.** **a) Economics (25 Marks-Equal distributions to all Chapters)** 1. **Towards Understanding Economics**: Exploring the Subject Matter of Economics-Role of Markets, their Functioning and Welfare-The Households-The Firm and Perfect Market Structure-Introduction to Macroeconomics and National Income Accounting. 2. **Statistical Methods:** Meaning, Classification and Tabulation of Data-Measures of Central Tendency and Partition Values-Measures of Dispersion-Correlation-Regression Analysis. 3. **Microeconomics:** Introduction-Consumer Behavior-Theory of Supply and Production-Theory of Cost-Theory of Revenue and Equilibrium. 4. **Mathematics for Economists:** Preliminaries-Functions of One Real Variable and Limits-Elementary Linear Algebra-Determinants-Matrices and Matrix Operations. 5. **Macroeconomics:** Nature and Scope of Macroeconomics-Employment and Output in a Growing Economy-The Classical System-The Keynesian Model-Money, Interest and Income. 6. **Money and Banking:** Concept of Money and Banking Definition, Functions and Theories of Money-Demand for Money-Money Supply-Central Banking-Conduct of Monetary Policy in India Monetary Policy. 7. **International Economics:** Introduction to International Economics-Theories of International Trade-Alternative Trade Theories-Economic Growth and International Trade-Terms of Trade, Tariff and Protection. 8. **Public Finance:** Role of Government-Taxation-Public Expenditure-Decentralization-Public Debt Management. 9. **Basic Econometrics:** Nature and Scope of Econometrics-Two Variable Regression Analysis-Multiple Regression Analysis-Testing of Hypothesis-Relaxing the Assumptions of the Classical Regression Model.

				10. **Indian Economy:** Indian Economy during the Colonial Period-Indian Economy at the time of Independence-Planning in India-Planning and Indian Agriculture-Need for an Inclusive Growth. 11. **History of Economic Thought:** Early Period-Classical Period-Marginalists-J M Keynes and his Contributions-Indian Economic Thought. **b) Commerce: (25 Marks-Equal distributions to all Chapters)** 1. **Financial Accounting:** Accounting-Subsidiary Books-Trial Balance-Bank Reconciliation Statement-Final Accounts of Sole Traders-Depreciation Accounting. 2. **Business Organization and Management:** Concept and Forms of Business Organizations-Joint Stock Company -Principles and Functions of Management-Planning and Organizing-Authority, Coordination and control. 3. **Advanced Accountancy:** Accounts of Non - Profit Organisations-Single Entry System-Average Due Date-Partnership Accounts-Hire Purchase Account. 4. **Business Law**: Indian Contract Act, 1872-The Sale of Goods Act, 1930-Negotiable Instruments Act, 1881-Information Technology Act, 2000-Competition Act, 2002 and Consumer Protection Act, 2019-Foreign Exchange Management Act, 1999. 5. **Principle of Costing:** Cost Accounting-Material Control-Labour Cost-Remuneration and Incentives-Overheads-Reconciliation of Cost and Financial Accounts. 6. **Goods and Service Tax**: Concept and types of Indirect Tax-Levy and collection of GST-Registration under GST-Input Tax Credit (ITC)-Administration of GST-Assessment of GST-Accounts & Records. 7. **Business Statistics:** Statistics-Measures of Central Tendency-Measures of Dispersion-Skewness-Simple and Liner Correlation Analysis-Index Numbers-Analysis of Time Series. 8. **Corporate Accounting:** Shares-Underwriting-Final Accounts-Valuation of Goodwill and Shares-Amalgamation, Absorption and Reconstruction-Accounts of Holding Companies-Liquidation. 9. **Management Accounting:** Management Accounting-Financial Statements-Ratio Analysis-Funds Flow Analysis-Cash Flow Analysis-Working Capital Management. 10. **Human Resource Management:** Introduction to Human Resource Management-Acquisition of Human Resources-Employee and Reward Systems-Motivation-Leadership. 11. **Company Law:** Companies Act, 2013- An Introduction-Incorporation of a Company-The Limited Liability Partnership (LLP) Act, 2008-Company Management and Administration-Company Meetings-Winding up of Companies. 12. **Sustainable Development:** Introduction-Sustainable Development Goals (SDGs)-Responsible Production and Mindful Consumption-Responsible Investment. 13. **Income Tax Law and Practice:** Introduction-Income from salaries-Income from House property-Income from Business / Profession-Income

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<td>from Capital gains-Income from Other Sources.
14. Money and Financial System: Money-Finance-Indian Banking System-Process of Credit Creation by Bank-Recent Trends in Banking-The Reserve Bank of India-Functions Instruments of monetary and credit control.
15. Methods and Techniques of Costing: Job Costing-Process Costing-Marginal Costing-Standard Costing-Budgetary Control-Software Based Managerial Decision Making.
16. Fundamental of Financial Management: Financial Management-Cost of Capital-Capital Budgeting-Management of Working Capital-Dividend Policies.
17. Fundamental of Investment: Investment Environment-Analysis of Equity and Debt Instruments-Portfolio Analysis and Financial Derivatives-Investor Protection.
18. Principles and Practice of Insurance: Principles of Insurance-Life Insurance-Marine Insurance-Fire Insurance-Marketing of Life Insurance Business.
19. International Trade and Export Management: Introduction to International Trade-International Trading Environment-Foreign Trade Policy and Regulation-Export Finance-Export Procedures and Documentation.</td>
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<tr>
<td>21</td>
<td>Directorate of Transport</td>
<td>(U)
Directorate of Disaster Management</td>
<td>Godown Incharge</td>
<td><u>Scheme of Examination:-</u>

<table>
<tr><th>Sl. No</th><th>Subject</th><th>No. of Questions(each question Shall carry one mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>English</td><td>20</td><td>20</td></tr>
<tr><td>II</td><td>General Awareness</td><td>20</td><td>20</td></tr>
<tr><td>III</td><td>Subject Knowledge</td><td>80</td><td>80</td></tr>
<tr><td colspan="2">Total</td><td>120</td><td>120</td></tr>
</table>

1.General Awareness & Reasoning
* Basic General Knowledge (Indian polity, economy, environment, current affairs)
* Logical Reasoning (analogy, series, classification, coding-decoding)
* Basic English Language (comprehension, grammar, vocabulary)
* Basic Quantitative Aptitude (percentages, ratios, averages, time & work)</td>
</tr>
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				2 Stock & Inventory Management/ Warehousing * Role & responsibilities of a godown/warehouse in-charge * Receiving, storing, dispatching goods * Stock records: bin cards, stock ledgers, reconciliation of physical vs book stock * Use of storage systems: racks, pallets, good housekeeping * Material handling equipment (MHE) basics (forklifts, pallet jacks) * Basic warehouse layout and optimisation 3. Documentation, Systems & Technology * Goods receipt note (GRN), dispatch note, stock transfer note * Documentation for inward/outward goods, returns, damaged goods * Data entry, reporting (daily/ monthly stock report, discrepancy report) * Basic computer knowledge: MS Office (Excel, Word) 4. Safety, Security & Compliance * Warehouse safety practices: fire safety, accident prevention, personal protective equipment (PPE) * Security of stock: theft prevention, pilferage management * Handling hazardous or sensitive goods (if applicable) * Compliance with relevant regulations (labeling, storage of chemicals if any) 5. Team Management & Operational Efficiency * Supervision of godown staff: allocation of duties, shift management * Optimising workflows: loading/ unloading, stacking, order picking * Coordination with other departments: procurement, dispatch, accounts, logistics * Quality control: checking goods for damages, expiration, etc. 6. Basic Accounting & Financial Awareness (if required) * Understanding cost implications: storage cost, carrying cost of inventory * Basic bookkeeping of stock values * Stock valuation methods ***apart from the topic detail above, questions from other topics prescribe from the Education Qualifications of the post also may be appear in the question paper.**

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<tr>
<td>22</td>
<td>Directorate of Transport</td>
<td>(W) Andaman Adim Janjati Vikas Samiti</td>
<td>Upper Division Clerk</td>
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<u>Scheme of Examination:-</u>
<table>
<tr><th>Sl. No</th><th>Subject</th><th>No of questions (each questions shall carry 01 mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>Subject Matter
Accountancy, cost accounting and booking and taxation</td><td>
100</td><td>
100</td></tr>
<tr><td>II.</td><td>General Aptitude
(i) English Language
(ii) Numerical Aptitude
(iii) General Awareness & General Intelligence & Reasoning</td><td>
25
25
50</td><td>
25
25
50</td></tr>
<tr><td></td><td></td><td>200</td><td>200</td></tr>
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</td>
<td>1Subject Matter Accountancy, cost accounting and booking and taxation</td>
<td>

Basic accounting principles and concepts (entity, transaction, capital, liabilities, assets, expense, revenue, cash book and ledger, subsidiary accounts)
Profit and Loss Accounts and Balance Sheet
Receipts and Payments, Income and Expenditure Accounts
Budgeting
Depreciation
Bank Reconciliation Statements
Taxation (Income Tax, TDS) and Audit
The Societies Registration Act, 1860, The
Employees Provident Fund and Miscellaneous Provisions Act, 1952
Basics of Cost accounting, book keeping, various types of inventory management
Assets and advances
Basics of computer

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								literacy
					2	**General Aptitude**	English Language	Questions in this test will be set to assess the knowledge of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms etc. There may also be questions based on comprehension of a passage.
							Numerical Aptitude	Questions will be designed to test the ability of arithmetical computation of whole numbers, decimal and fraction and relationship between numbers. This test will also includes question on problems relating to percentage, ratios and proportions, average estimation, use of table and graphs, mensuration, time and distance, ratio and time etc

							General Awareness and General Intelligence & Reasoning	Questions will be designed to test the ability of the candidate's general awareness of the environment around him and its application to the society. Questions will also be designed to test knowledge of current affairs, observations/experience and elementary knowledge of computers. The test will also include questions relating to India and other countries especially, pertaining to History, Culture, Geography, Economics, Science, General Politics and Scientific Research etc. The test will include questions on similarities and difference, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observations, relationship, concepts, figure classification, arithmetical number series, non-verbal series to test. The test will also include questions design to test the candidates' abilities to deal with abstract ideas and symbol and their relationship, arithmetical

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>computation and other analytical functions.</td></tr>
<tr><td>23</td><td>Electricity Department, Sri Vijaya Puram</td><td>(X) Electricity Department, Sri Vijaya Puram</td><td>Junior Engineer</td><td colspan="5">
<u>Scheme of Examination:-</u>
<table>
<tr><th>Sl. No</th><th>Subject</th><th>No of questions (each questions shall carry 01 mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>Mechanical, Electrical and Electrical & Electronics</td><td>80</td><td>80</td></tr>
<tr><td>II.</td><td>General Intelligence & Reasoning</td><td>10</td><td>10</td></tr>
<tr><td>III</td><td>General Awareness</td><td>10</td><td>10</td></tr>
<tr><td colspan="2">Total</td><td>100</td><td>100</td></tr>
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Each wrong option : (-) 0.25
</td></tr>
</table>

SYLLABUS FOR RECRUITMENT EXAMINATION

OF JUNIOR ENGINEER IN ELECTRICITY DEPARTMENT

1. <u>INDICATIVE SYLLABUS – For Computer based examination.</u>

(i) <u>ELECTRICAL ENGINEERING, ELECTRICAL & ELECTRONICS ENGINEERING</u>

Basic Electrical Engineering & Electrical Measurements: Concept of currents, voltage, resistance power & energy, their units, ohm's law, electrical symbols, circuit laws and theorems.

Electro-Magnetic induction: Self and mutual inductance

A.C fundamentals: Instantaneous peak, R.M.S and average value of alternating wave, simple Series and Parallel A.C circuits consisting of Resistance, inductance & Capacitance, Analog & Digital ammeters and voltmeters, Wattmeter, Multi-meters, Megger, Low Voltage transformers CT & PT.

Measurement & Measuring Instruments: Moving coil and moving iron ammeters and Voltmeters. Extension of range, Watt-meters, Multimeters, Megger, Basic Electronics.

Electrical Machines: Basic principles of D.C. Motors and generators, their characteristics, speed control & Starting of DC Motors, losses & efficiency of D.C Machines, parallel operations of AC generators.

1-Phase & 3 Phase Transformers: Principles of operation, equivalent circuit, voltage regulation O.C. and S.C tests, efficiency, auto transformers, parallel operation of transformers.

Synchronous Machines: Generation of three phase emf, Armature reaction, Voltage regulation, Parallel operation of two alternators, synchronizing, starting and applications of synchronous motors.

3 Phase Induction Motor: Rotating magnetic field, principle of operation, equivalent circuit, torque speed characteristic, starting & speed control of 3 phase induction motors, Fractional KW motors, 1-phase induction motors ac, series motor, reluctance motors.

General, Transmission & Distribution: Different types of power stations, load factor, diversity factor, demand factor, simple problems thereon, cost of generation, inter connection of power stations, power factor improvement, various types of tariffs, types of faults, short

				circuit current for symmetrical faults. **Battery:** Automotive battery- construction and operation, battery capacity & ratings. Battery tests Charging System- Uses, Construction, operation & maintenance of charging system & battery banck. Schematic &working of alternator, starting system, lighting system. **Switchgears:** Rating of Circuit breakers Principles of extinction by oil and air, HRC fuses, protection earthier leakage, over current Buchholz relay, Merzprice system of protection of generators & transformers, protection of feeders and bus bars. **Lightning Arrestors in various transmission & distribution systems**: Comparison of conductor material efficiency of different systems. **Utilization of Electrical Energy:** Illumination, electric heating. Electric Welding, Electroplating, Electric Drives & Motors, fine fighting equipment, safety precaution. **Estimation and costing:** Estimation of lighting scheme, electric installation of machine and relevant IE rules. Details of illumination system, details of load distribution, Design of electrical installation & its symbols (internal & external), Energy efficient equipment, energy audit, protection systems of Electrical circuit, residential and commercial wiring, safety protocol and equipment handling, Earthling Systems, Testing of Electrical Installations, types of cables –Overhead & underground. **Basic Electronics:** Atomic structure of elements, the electron Energy of an electron valence electrons- Free electrons- Voltage source- Constant voltage source- Constant current source. **Electron Emission:** Electron emission, types of electron emission-Thermion emission- Thermionic emitter. **Transistors:** Transistor action-Transistor symbols-Transistor as an amplifier. **Regulated D.C. Power Supply:** Ordinary DC Power supply, Regulated power supply. Types of voltage regulators- Zener diode voltage regulator. **Electronic Instruments**: Electronic instruments, Multi-meters, Applications of multi-meter sensitivity of multi-meter, merits & demerits of multi-meter. Meter protection Vacuum tube voltmeter-applications of VTVM-merits and demerits of VTVM. **Semi Conductor Physics:** Semi- conductor Bonds in semiconductor-commonly used semiconductors, energy band description of semiconductors-effect of temperature on semiconductor-intrinsic semiconductor-extrinsic semiconductor- properties of pn junction.

				Semi Conductor Diode: Semiconductor diode, Half wave rectifier-full wave rectifier, zener diode. **Solid State Switching Circuits:** Switching Circuit-Mechanical Switch Electronic Switch, Advantages of Electronic Switches-Switching action of a transistor. **Working Principle, Advantage & Application of field effect transistors.** **Working Principle, Advantage & Application of Silicon Controlled Rectifier (SCR).** **Working Principle, Advantages & Applications of Triac.** **Working Principle. Advantages & Application of Unijunction Transistor(UJT).** **Renewable Energy:** Solar Energy – Direct Uses, concept, working principle and application of solar thermal systems, Power Generation (On grid & Off Grid System) with simple numericals, Solar Photovoltaic System (SPV) Applications- Solar Lantern, Solar Home System, SPV Street Light, SPV Pumping systems. **MECHANICAL ENGINEERING:** **Flow of Fluids:** Laminar & turbulent flow, equation of continuity. Bernoulli's theorem, measurement of discharge, flow through pipes friction losses. Forces of jet impinging on vanes, blades, work done and efficiency, classification of turbines & pumps. **Thermal Engineering**: Laws of thermodynamics, change in entropy in various processes, properties of steam, uses of steam table & charts, construction & working of Cochran, Lancashire Locomotive & Babcock & Wilcox Boilers, Working of steam turbine, Otto & Diesel Cycles, working of IC Engines, Carburetion, Solex Carburetor, Diesel Fuel Pump & Injector Cooling & Lubrication. **Production Engineering:** Foundry different casting processes, concept of patterns, types of mould making, pouring defect in castings, causes & remedies, welding classification and types of welding. Testing & defects in welds, Lathes-working of lathes, various tools, operation on lathes, types of lathes, drilling operations performed on drilling machines **Description of Principles** of working and various operations on machines tools milling machine. Shaper, grinder, boring & slotting machines **Strength of Materials:** Stresses in composite bars, relation between elastic constants, Resilience under different types of loads, SF & BM Diagrams Stresses in beams combined direct & bending stresses, struts & columns Euler's Rankin's theories, Torsion of circular shafts.

				Theory of Machines: Simple Mechanisms -Four bar Chain, Slider crank chain, double slider crank chain, flywheel-Turning movement diagrams. Fluctuation of energy. Friction in collar and pivots, plane clutch, conical clutch, journal bearing. Transmission of power through flat and V-belts, Gears, profile of gears, Governors - types and working, cams and followers - types and cam profile. **Applied Mechanics:** Concept of Mechanics, explanations, concept of rigid bodies, Law of forces, Bow's notation, types of forces, action and reaction, resultant and components of forces. Lamie's Theorem-concept of moments, varignon's theorem, application of moments to simple mechanism, equilibrium of bodies under coplanar forces, friction, Concept, laws and limitations, center of gravity, centroid for regular lamina and center of gravity for regular solids, moments of inertia, Law of motion concept of machine, mechanical advantage conservation of momentum. **Automobiles:** Classification and types of automobile vehicles, two and four wheeler chassis layout and body types. Layout of vehicle such as front engine rear wheel drive, front engine front wheel drive, rear engine rear wheel drive, four wheels drive etc. their advantages, comparisons on Aerodynamic basis. **I.C. Engine:** Ignition method of I. C. Engine (C.I & S.I). Two & Four stroke Engines: construction and working. Various terms related to I.C Engine: scavenging, pre-ignition, detonation, supercharging, turbo charging, air fuel ratio requirements, M.P.F.I., fuel injection pump. **Fuels:** Properties, calorific value & ignition temperature of fuels. Characteristics of a good/ ideal fuel. Liquid fuels: fractional distillation, composition, properties, uses. Applications of-Biodiesel. Gaseous fuels- properties, applications of Biogas, LPG, CNG, hydrogen fuel cell, Li-ion battery. **Lubricant:** Definition, functions, classification& application of lubricant. Selection of Lubricants. **Industrial Safety:** Safety Management, Causes, types, Preventive measures& Safety procedures of Industrial Accidents. Inventory Concept, ABC Analysis - Necessity & Steps, Economic Order Quantity Concept, graphical representation, determination of EOQ, Standard steps in Purchasing, Modern Techniques of Material Management. **Materials Management:** Inventory Concept, its classification, functions of inventory, Standard steps in Purchasing, Modern Techniques of Material Management- Material Resource Planning (MRP) - Functions of MRP, Input to MRP, Benefits of MRP, Enterprise Resource Planning (ERP) - Concept, list of modules, advantages & disadvantages of ERP **Welding Soldering Brazing:** General characteristics of welded joints, principle of welding, types of welding process and their brief, gas welding and arc welding, high pressure gas welding and low pressure gas welding, DC welding & AC welding, selection of electrodes, fluxes, current torches and equipment, specification of tools, materials according to IS standard, principles of soldering and brazing, types of solders &

				soldering fluxes, soldering tools and equipments, defects and remedies, brazing joints, brazing process, description of brazing tools, brazing filler alloys and fluxes, limitations and applications of soldering and brazing **Advance Welding and Technology:** TIG, MIG laser beams and thermal welding **Materials Science and Technology:** Importance of materials Classification, atomic structure, crystal structure and imperfection, properties of materials, strength. ductility, malleability, toughness, resilience, stiffness, hardness stages of deformation, mechanical testing of material, tensile test, hardness test (Brinell HT & Rockwell H.T), impact test, ferrous and non-ferrous materials, insulating materials, fundamental of heart treatment, iron-carbon diagram, TTI curie. **Mechanism:** Simple Mechanism, Kinematics links, pairs, chain for bar chain, cams types and followers with classification, loss of friction between dry surface, coefficient of friction power absorbed in fraction for pivot bearings (flat, collar, conical) power transmission, types of belts, material and specification. **Refrigeration:** Meaning, methods units, reverse carnot cycle heat pump, refrigerating systems, refrigerants, system, components and control psychometry dry and wet bulb temperature, saturation, dew point. **Metrology:** Types of measurements, linear angular, gear tooth vernier, surface measurements, precision and accuracy, inspection and quality control surface finish. **Quality Management**: Meaning of Quality, Quality Control –Concept, Objectives, Functions, Advantages. Meaning of Total Quality and TQM, Components of TQM – Concept, Elements of TQM, & Systems of Quality Management like Kaizen,5'S',6 Sigma, ISO 9001:2000 – Benefits. **(ii) <u>GENERAL INTELLIGENCE & REASONING:</u>** The syllabus for General Intelligence would include questions of both verbal and Non-verbal type. The test will include questions on analogies, similarities and difference, space visualization, problem solving analysis, judgment, decision making, visual memory, discrimination observation, relationship concepts, arithmetical reasoning, verbal and figure classification, arithmetical number series, non- verbal series etc. The test will also include questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationship, and other analytical functions. **(iii) <u>GENERAL AWARENESS:</u>** Questions will be aimed at testing the ability of the candidate's general awareness of the environment around him/her and its application to society. Questions will also be designed to test the knowledge of current events and of such matters of everyday observations and experience in their scientific aspect as may be expected of any educated person and elementary knowledge of computers. The test will also include questions relative to India and its neighbouring Countries especially pertaining to History, Culture, Geography, Economic, Science, General

<table>
<tr><td></td><td></td><td></td><td></td><td>Politic and Scientific research etc. These questions will be such that they do not require a special study of any discipline.</td></tr>
<tr><td>24</td><td>Electricity Department, Sri Vijaya Puram</td><td>(Y) Andaman Public Work Department</td><td>Junior Engineer (Electrical & Mechanical)</td><td><u>Scheme of Examination:-</u>
<table>
<tr><th>Sl. No</th><th>Subject</th><th>No of questions (each questions shall carry 01 mark)</th><th>Maximum Marks</th></tr>
<tr><td>I</td><td>Mechanical, Electrical and Electrical & Electronics</td><td>80</td><td>80</td></tr>
<tr><td>II.</td><td>General Intelligence & Reasoning</td><td>10</td><td>10</td></tr>
<tr><td>III</td><td>General Awareness</td><td>10</td><td>10</td></tr>
</table></td></tr>
</table>

				Total	**100**	**100**	**Each wrong option : (-) 0.25**

SYLLABUS FOR RECRUITMENT OF JUNIOR ENGINEER (E&M)

1. **Basic Electrical Engineering:**Concept of currents, voltage, resistance, power & energy, their units, Ohm's law, electrical symbols.
2. **Circuit Laws:** Kirchhoff's law, Superposition, Thevenin, Norton, Star- delta network theorems with simple numerical.
3. **Magnetic Circuit:** Concept of flux, EMF, inductance, different kind of magnetic materials, Electro-magnetic induction-Self & Mutual inductance.
4. **A.C fundamental:** Instantaneous, peak, R.M.S and average value of alternating wave, simple Series and Parallel A.C circuits consisting of Resistance, inductance & Capacitance, Analog & Digital ammeters and voltmeters, Wattmeter, Multi-meters, Megger, Low Voltage transformers CT & PT.
5. **Electrical Machines:** Basic principles of AC & D.C. machines (Motors & Generators), construction, principles of operation, speed control & Starting, losses & efficiency of AC & D.C. Machines, equivalent circuit, voltage regulation. Transformer O.C and SC tests, efficiency, auto transformers. Principle of operation, equivalent circuit, torque speed characteristics, starting and speed control of 3 phase induction motor, Generation of three phase EMF, 3-Phase induction motor, rotating magnetic field. Fractional KW motors, 1- Phase induction motor, types of AC Motors, DG Sets, operation.
6. **Estimation and costing:**Estimation of lighting scheme, electric installation of machine and relevant IE rules. Details of illumination system, details of load distribution, Design of electrical installation & its symbols (internal & external), Energy efficient equipment, energy audit, protection systems of Electrical circuit, Earthling Systems, Testing of Electrical Installations, types of cables –Overhead & underground.
7. **General Distribution:** Types of faults – symmetrical and unsymmetrical faults, short circuit current for symmetrical faults, Protection & Switchgear-rating of circuit breakers, principles of arc extinction by oil and air, H.R.C fuses, Protection earth leakage. Lightning Arrestors
8. **Utilization of electrical energy:** Illumination-types of lamps, utilization and applications, electric welding, electric drivers etc.
9. **Renewable Energy:**Solar Energy – Direct Uses, concept, working principle and application of solar thermal systems, Power Generation (On grid & Off Grid System) with simple numerical, Solar Photovoltaic System (SPV) Applications- Solar Lantern, Solar Home System, SPV Street Light, SPV Pumping systems.

				10. **Introduction to Refrigeration:** Terms, component & working of refrigeration system and properties, C.O.P., E.E.R, unit of refrigeration, Concept of heat engine, heat pump and refrigerator, various refrigeration cycles: refrigeration using simple air cooling system , Reversed Carnot Cycle , Air Refrigeration Cycles - Bell Coleman air refrigerator & their respective plot on P-V and T-S.**,** Refrigerants, types, nomenclature, selection &harmful environmental effects like greenhouse effect, ozone depletion etc… of refrigerants. Eco- friendly refrigerants like R-134a, HCFC etc…Non-conventional methods of refrigeration: Vortex tube, Pulse tube refrigeration. **11. Air Conditioning & Air Distribution Systems:** Classification of various air conditioning systems, Industrial & commercial Air Conditioning Systems: split type, central type AC, VRF/VRV- maintenance& application. Air distribution systems: duct systems, closed perimeter system, extended plenum system, radial duct system and properties and losses in duct materials. Types & working of fans and blowers-types of diffusers. Thermal & sound Insulation. **12. Battery:** Automotive battery- construction and operation, battery capacity & ratings. Battery tests Charging System- Uses, Construction & operation of charging system. Schematic &working of alternator, starting system, lighting system, ignition system and their components in automobile. **13. Types of measurement, classification of instruments Static terms and characteristics:** Range and Span, Accuracy and Precision, Reliability, Calibration, Hysteresis and Dead zone, Drift, Sensitivity, Threshold and Resolution, Repeatability and Reproducibility, Linearity. **14. Basic Electronics:** Electronics- Atomic structure of elements. The electron Energy of an electron valence electrons – Free electrons -Voltage source - Constant voltage source - Constant current source. **15. Electron Emission:** Electron emission, types of electron emission-Thermion emission – Thermionic emitter. **16. Regulated D.C. Power Supply:** Ordinary D.C. Power supply, Regulated power supply. Types of voltage regulators - Zenor diode voltage regulator. **17. Semi-Conductor Physics:** Semi-conductor Bonds in semiconductor-commonly use semiconductors, energy band description of semiconductors-effect of temperature on semiconductor-intrinsic semiconductor-extrinsic semiconductor-properties of p-n junction. **18. Semi-Conductor Diode:** Semi-conductor diode, logic gates, half wave rectifier-full wave rectifier, zener diode, special diodes, optical diodes, Filters-LC filter, π filter. Principle & application of Solid State Switching Circuits.

				19. Transistors: Field effect transistors, Uni-junction Transistor (UJT): Construction, working principle, advantage & application **20. Rectifiers:** Silicon Controlled Rectifier (SCR), Triace**:** Construction, working principle, advantage & application. **21. Flow of Fluids:** Flow through pipes& discharge measurement- Venturi meter, Orifice meter, Nozzle Meter major. Minor friction losses. Forces of jet impinging on vanes- stationary & moving blades, work done and efficiency. Classification of pumps & turbines on constructional. **22. Production Engineering:** *Casting***-**Concept and types of Moulds and pattern, different types of sand used for casting, different casting processes. Defects in casting: pouring defect in castings, causes & remedies. ***Welding–***Concept and types of welding, defects in welds, difference in welding, brazing and soldering. ***Lathes-***Working of lathes, various tools and its operation on lathes, types of lathes, drilling operations performed on drilling machines. Description, Principles of working and various operations on machines tools milling machine, *Shaper, grinder, boring & slotting machines, Plating*. **23. Automobiles:** Classification and types of automobile vehicles, two and four wheeler chassis layout and body types. Layout of vehicle such as front engine rear wheel drive, front engine front wheel drive, rear engine rear wheel drive, four wheels drive etc. their advantages, comparisons on Aerodynamic basis. **24. Transmission Systems:** Need and Requirements of transmission system. Components and functions of Clutch, Gear box, Propeller shaft, Differential, Axle. **25. Control Systems:** *Steering System*-Purpose, construction and working of - recirculating ball type and rack and pinion steering system. Power steering, *Wheel Geometry*- caster, camber, king pin inclination, Toe In and Toe Out. *Braking System*: Need &types of automotive braking systems for two and four wheeler vehicles: mechanical, hydraulic and air operated. Layout, components, construction and working of hydraulic braking systems, master cylinder and wheel cylinder, Drum braking system, Disc Braking Systems Air braking system. **26. Suspension Systems, Wheels and Tires:** Types of *wheel*-spooked, disc, light alloy cast. Types of *rims*. Tires specifications. Types - redial ply, cross ply, tubeless. Tires specifications. Factors affecting tyre life.Tires-Desirable properties &Wheel alignment and balancing. **27. I.C. Engine: I**gnition method of I. C. Engine (C.I & S.I). *Two & Four stroke Engines*: construction and working. Various terms related to I.C Engine: scavenging, pre-ignition, detonation, supercharging, turbo charging, air fuel ratio requirements, M.P.F.I., fuel injection pump.

				28. **I.C. Engine Testing and Pollution Control:** *IC Engine Testing* - I.P., B.P. Morse Test. List of fuel, lubricant additives and their advantages. Pollution Control, their effects on environment, Catalytic Converter, Bharat stage III, IV, VI norms. 29. **Air Compressor:** Concept of single and multistage, single and double acting compressor& methods of energy saving. Types- Reciprocating Air Compressor, Rotary Compressor. Pressure ratio, Compressor capacity, Free Air Delivered, Swept volume of air compressor. Uses of compressed air. 30. **Fuels:** Properties, calorific value & ignition temperature of fuels. Characteristics of a good/ ideal fuel. Liquid fuels: fractional distillation, composition, properties, uses. Applications of-Biodiesel. Gaseous fuels- properties, applications of Biogas, LPG, CNG, hydrogen fuel cell, Li-ion battery. 31. **Lubricant:** Definition, functions, classification& application of lubricant. Selection of Lubricants for road rollers, sewing machine, concrete mixer, I.C engine, cutting tools, gears. Different method of lubricating system in I.C engine. 32. **Simple Machines**: Find Efficiency of given machine, *Definitions*: Simple &compound machine , load , effort , mechanical advantage, velocity ratio , input of a machine ,output of a machine efficiency of a machine , ideal machine, ideal effort and ideal load, load lost in friction, effort lost in friction. 33. **Industrial Safety:** Safety Management**,** Causes**,** types, Preventive measures& Safety procedures of Industrial Accidents**.** Inventory Concept, ABC Analysis - Necessity & Steps, Economic Order Quantity Concept, graphical representation, determination of EOQ, Standard steps in Purchasing, Modern Techniques of Material Management. 34. **Materials Management:** Inventory Concept, its classification, functions of inventory, Standard steps in Purchasing, Modern Techniques of Material Management- Material Resource Planning (MRP) - Functions of MRP, Input to MRP, Benefits of MRP, Enterprise Resource Planning (ERP) - Concept, list of modules, advantages & disadvantages of ERP 35. **Quality Management:** Meaning of Quality**,** Quality Control –Concept, Objectives, Functions, Advantages**.** Meaning of Total Quality and TQM**,** Components of TQM – Concept, Elements of TQM, & Systems of Quality Management like Kaizen,5'S',6 Sigma, ISO 9001:2000 – Benefits. 36. **Basics of Oil Hydraulic System:** Various components in simple oil hydraulic circuits, components, Construction & working principle. Overview of essential properties of hydraulic fluids.

<table>
<tr><td></td><td></td><td></td><td></td><td>37. Basic Design Considerations: General Considerations in Design, Types of loads, concepts & type of stress (Tension, Compression, Shear, Bearing pressure, Intensity, crushing, bending and torsion, Principle Stresses (Simple Numerical)), &strain, Stress – Strain Diagram for Ductile and Brittle Materials, Concept of Creep, Fatigue, S-N curve, Endurance Limit.
38. Modern Design considerations: Design for safety, Ecology, societal consideration & Concept of Product Design, System Design & Creativity in Design, Ergonomics and aesthetic considerations in design.</td></tr>
<tr><td>25</td><td>Department of Environment & Forests</td><td>(Z) Directorate of Shipping Service</td><td>Foreman (Fitting Shop)</td><td rowspan="3"><u>Scheme of Examination:-</u>

<table><tr><th>Sl. No</th><th>Subject</th><th>No of questions (each questions shall carry 01 mark)</th><th>Maximum Marks</th></tr><tr><td>I</td><td>Mechanical Engineering</td><td>200</td><td>200</td></tr><tr><td colspan="2">Total</td><td>200</td><td>200</td></tr></table>Negative marking (if any) : No

The question paper pattern : MCQ Type
Maximum Marks : 200
No. of questions : 200 MCQs
Marks allotted to each question : 01
Negative marking (if any) : No

<u>MECHANICAL ENGINEERING</u>
1. Fluid Mechanics :
Basic concepts and properties of fluid, Manometry, Fluid Statics, Buoyancy, Equations of Motion, Bernoulli’s equation and applications, Viscous flow of incompressible fluids, Laminar and Turbulent flows, Flow through pipes and head losses in pipes</td></tr>
<tr><td>26</td><td>Department of Environment & Forests</td><td>(ZA) Department of Environment & Forests</td><td>Marine Foreman</td></tr>
<tr><td>27</td><td>Department of Environment & Forests</td><td>(ZB) Department of Environment & Forests</td><td>Mechanical Extraction Charge Hand (MECH)</td></tr>
</table>

				2. Thermodynamics and Heat transfer: Thermodynamic systems and processes; properties of pure substance; Zeroth, First and Second Laws of Thermodynamics; Entropy, Irreversibility and availability; analysis of Thermodynamic cycles related to energy conversion; Rankine, Otto, Diesel and Dual Cycles; ideal and real gases; compressibility factor; Gas mixtures. Modes of heat transfer, Steady and unsteady heat conduction, Thermal resistance, Fins, Free and forced convection, Correlations for convecting heat transfer, Radiative heat transfer- Radiation heat transfer co-efficient; boiling and condensation, Heat exchanger performance analysis. **3. IC Engines, Refrigeration and Air Conditioning:** SI and CI Engines, Engine Systems and Components, Performance characteristics and testing of IC Engine; Fuels; Emissions and Emission Control Vapor compression refrigeration, Refrigerants and working cycle, Compressors, Condensers, Evaporators and Expansion devices, other types of refrigeration systems like Vapour Absorption, Vapour jet, thermo electric and Vortex tube refrigeration. Psychometric properties and processes, Comfort chart, Comfort and industrial air conditioning, Load calculations and Heat pumps. **4. Machines:** Theory of Machines, Reciprocating and Rotary pumps, Pelton wheel, Kaplan and Francis Turbines, velocity diagrams, Impulse and Reaction principles, Steam and Gas Turbines, Theory of Jet Propulsion - Pulse jet and Ram Jet Engines, Reciprocating and Rotary Compressors - Theory and Applications **5. Power Plant Engineering:** Rankine and Brayton cycles with regeneration and reheat, Fuels and their properties, Flue gas analysis, Boilers, stam turbines and other power plant components like condensers, air ejectors, electrostatic precipitators and cooling towers - their theory and design, types and applications; **6. Renewable Sources of Energy: •** Solar Radiation, Solar Thermal Energy collection - Flat Plate and focusing collectors their materials and performance. Solar Thermal Energy Storage, Applications - heating, cooling and Power Generation; Solar Photovoltaic Conversion; Harnessing of Wind Energy, Bio-mass and Tidal Energy - Methods and Applications, Working principles of Fuel Cells- 7. **Engineering Mechanics:** Analysis of System of Forces, Friction, Centroid and Centre of Gravity, Dynamics; Stresses and Strains-Compound Stresses and Strains, Bending Moment and Shear Force Diagrams, Theory of Bending Stresses- Slope and deflection-Torsion, Thin and thick Cylinders, Spheres. **8. Engineering Materials:**

				Basic Crystallography, Alloys and Phase diagrams, Heat Treatment, Ferrous and Non Ferrous Metals, Non metallic materials, Basics of Nano-materials, Mechanical Properties and Testing, Corrosion prevention and control **9. Mechanisms and Machines:** Types of Kinematics Pair Mobility Inversions, Kinematic Analveis. Velocity and Acceleration Analvsis of Planar Mechanisms, CAMs with uniform acceleration and retardation, cycloidal motion, oscillating followers; Vibrations -Free and forced vibration of undamped and damped SDOF systems, Transmissibility Ratio, Vibration Isolation, Critical Speed of Shafts. Gears - Geometry of tooth profiles, Law of gearing, involute profile, interference, Helical, Spiral and Worm Gears, Gear Trains- Simple, compound and Epicyclic; Dynamic Analysis - Slider - Crank mechanisms, turning moment computations, balancing of Revolving & Reciprocating masses, Gyroscopes -Effect of Gyroscopic couple on automobiles, ships and aircrafts, Governors. **10. Design of Machine Elements:** Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles. of the design of machine elements such as riveted, welded and bolted joints. Shafts, Spur gears, rolling and sliding. contact bearings, Brakes and clutches, flywheels. Computer Aided Designing, Basics of CAD Software, Computer Aided Manufacturing (CAM) **11. Manufacturing, Industrial and Maintenance Engineering:** Metal casting-Metal forming, Metal Joining, Machining and machine tool operations, Limits, fits and tolerances, Metrology and inspection, computer Integrated manufacturing, FMS, Production planning and Control, Inventory control and operations research - CPM-PERT. Failure concepts and characteristics-Reliability, Failure analysis, Machine Vibration, Data acquisition, Fault Detection, Vibration Monitoring, Field Balancing of Rotors, Noise Monitoring, Wear and Debris Analysis, Signature Analysis, NDT Techniques in Condition Monitoring **12. Mechatronics and Robotics:** Microprocessors and Microcontrollers: Architecture, programming, 1/0, Computer interfacing, Programmable logic controller. Sensors and actuators, Piezoelectric accelerometer, Hall effect sensor, Optical Encoder, Resolver, Inductosyn, Pneumatic and Hydraulic actuators, stepper motor, Control Systems- Mathematical modeling of Physical systems, control signals, controllability and observability. **Others:** Emerging Trend in Mechanical Engineering, Industrial Engineering and Quality Control, Production Engineering, Basic of Electrical Engineering, Basics of Electronics Engineering, Engineering Drawing, Environmental Sciences, Basic of Engineering Mathematics, Applied Science

<table>
<tr>
<td>28</td>
<td>JNRM, Sri Vijaya Puram</td>
<td>(ZC) JNRM, Sri Vijaya Puram</td>
<td>Laboratory Assistant</td>
<td>
<u>Scheme of Examination:-</u>

<table>
<tr><th>Sl. No</th><th>Subject</th><th>No of Question (each question shall carry one mark)</th><th>Maximum Mark</th></tr>
<tr><td>I</td><td>General Intelligence & Reasoning</td><td>50</td><td>50</td></tr>
<tr><td>Ii</td><td>Numerical Aptitude</td><td>50</td><td>50</td></tr>
<tr><td>Iii</td><td>General English</td><td>50</td><td>50</td></tr>
<tr><td>iv</td><td>General Awareness</td><td>25</td><td>25</td></tr>
<tr><td>V</td><td>Subject Oriented</td><td>25</td><td>25</td></tr>
</table>

(i) General Intelligence & Reasoning: - The test will include questions on similarities and differences, space visualization, problem solving, analysis, judgement, decision making, visual memory, discriminating observation, relationship concepts, figure classification, arithmetical number series, non-verbal series etc. The test will also include questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationships, arithmetical computations and other analytical functions.
(ii) Numerical Aptitude: Questions will be designed to test the ability of arithmetical computation of whole numbers, decimal and fraction and relationship between numbers. This test will also includes question on problems relating to percentage, ratios and proportions, average estimation, use of table and graphs, mensuration, time and distance, ratio and time etc.
(iii) English Language: Questions in this test will be set to assess the knowledge of English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms etc. There may also be questions based on comprehension of a passage.
(iv) General Awareness: Questions will be designed to test the ability of the candidate's general awareness of the environment around him and its application to the society. Questions will also be designed to test knowledge of current affairs,/ observations/ experience and elementary knowledge of computers. The test will also include questions relating to India & other countries especially, pertaining to History, Culture, Geography, Economics, Science, General Politics and Scientific Research etc.
(v) Subject Oriented Paper: For Laboratory Assistant: Questions will be designed to test the ability of the candidate's in General Physics, General Chemistry, Basic Botany, Basic Zoology and the basic laboratory techniques.
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<tr>
<td>29</td>
<td>Office of Labour Commissioner & DET</td>
<td>(ZD) Office of Labour Commissioner & DET</td>
<td>Labour Inspector</td>
<td>
<u>Scheme of Examination:-</u>

<table>
<tr><th>Sl.</th><th>Subject</th><th>No of Question (each</th><th>Maximum</th></tr>
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No		question shall carry one mark)	Mark
I	Concerned Technical Subject (Labour Laws)	80	80
Ii	General Knowledge	20	20
III	Each correct Answer	01	-
IV	Each wrong Answer	(-)0.25	-
Total		100	100

Part-I (Labour Laws)- 80 Marks

a. The Minimum Wages Act, 1948
b. The Payment of Wages Act, 1936
c. The Building and Other Construction worker (RE&CS) Act, 1996
d. A&N Islands shops & Establishment regulation, 2004
e. The payment of Gratuity Act, 1972
f. The payment of Bonus Act, 1986
g. The child labour (P&R) Act
h. The Motor Transport Worker (RE&CS) Act,1979
i. The Factories Act, 1948
j. The Contract Labour (R&A) Act, 1970
k. The equal remuneration Act,1976
l. The factories Act, 1948
m. The maternity benefit Act, 1901
n. The trade union Act, 1901
o. The code on wages, 2019
p. The Industrial Relations Code, 2020

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q. The code on social security, 2020
r. The occupational safety, Health and Working condition code, 2020
<u>Part-II (General Knowledge – 20 Marks)</u>
The General Knowledge of latest updates news and current affairs.
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<tr>
<td>33</td>
<td>Office of the Commissioner food safety</td>
<td>(ZH) Office of the Commissioner food safety</td>
<td>Food Safety Officer</td>
<td>
<u>Scheme of Examination:-</u>

<table>
<tr><th>Sl. No</th><th>Subject</th><th>No of Question (each question shall carry two mark)</th><th>Maximum Mark</th></tr>
<tr><td>I</td><td>Food Science & Food Safety</td><td>80</td><td>160</td></tr>
<tr><td>II</td><td>General Intelligences and Reasoning</td><td>10</td><td>20</td></tr>
<tr><td>III</td><td>General Awareness</td><td>10</td><td>20</td></tr>
<tr><td></td><td>Total</td><td>100</td><td>200</td></tr>
</table>
Mark for each wrong answer = (-)0.25

SYLLABUS FOR EXAMINATION FOR THE POST OF FOOD SAFETY OFFICER, A&N ADMINISTRATION
A General Awareness & General Knowledge: - Questions in this test will aim at measuring knowledge of current events besides knowledge of General Science/Social Science and their application to the society. This test will also include questions on sports, culture, history, geography, general polity etc. These questions will be such that they do not require a special study of any discipline. (20 marks)

B English Language:- Questions in the test will be based on error recognition, fill in the blanks (using verbs, prepositions, articles etc.) vocabulary, spelling, sequence of sentences in a paragraph, sequence of words in a sentence, closed passage and comprehension passage etc. synonyms and antonyms will be asked in the context of the given passage. (20 marks)

C Numerical Aptitude:- The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The scope of the test will be the computation of whole numbers, decimals and fractions and relationships between numbers. It will test sense of
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				order among numbers, ability to translate from one name to another, sense or order of magnitude, estimation or prediction of the outcome of computation, selection of an appropriate operation for the solution of real life problems and knowledge of alternative computation procedures to find answers. The questions would also be based on arithmetical concepts and relationship between numbers and not on complicated arithmetical computation. **(20 marks)** **D Food Science & Food Safety** **Indian and International Food Laws (An Overview)** **(15 marks)** 1. Food Safety and Standards Act, 2006, Provisions, definitions and different sections of the Act and its implementation 2. Food Safety and Standards Rules, 2011 and Regulations made there under. 3. Overview of other relevant national bodies (e.g. Agriculture & Processed Food products export development authority(APEDA), Bureau of Indian Standards, Export Inspection Council, Marine products export development authority (MPEDA), Spices Board etc.) 4. International Food Control Systems/Laws, Regulations and Standards/Guidelines with regard to Food Safety– (i) Overview of CODEX Aliment Arius Commission (History, Members, Standard setting and Advisory mechanisms: Joint FAO/WHO Expert Committee on Food Additives (JECFA), Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment (JEMRA), Joint Meeting on Pesticide Residues (JMPR): World Trade Organization agreements (Sanitary and Phyto-sanitary/ Technical Barrier Treaty). 5. Important national and international accreditation bodies **Principles of Food Preservation, Processing and Packaging** **(15 marks)** 1. Food Processing Operations, Principles, Good Manufacturing Practices 2. Overview of food preservation methods and their under lying principles including novel and emerging methods/principles 3. Overview of food packaging methods and principles including novel packaging materials/techniques **Principles and Basics of Food Chemistry and their role in Human Nutrition** **(15 marks)** 1. Structure and functions of macro and micronutrients 2. Role of macro and micronutrients in human nutrition

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<td>3. Over view of food additives with respect to their technological functions
4. Over view of anti-nutritional factors and their removal from foods
5. Over view of enzymes as food processing aids
6. Over view of nutraceuticals and functional foods
7. Overview of food contaminants, adulterants and their effects on human health
8. Food allergens and allergen city
9. Importance of diet in alleviating health risks, especially non communicable diseases

Food Microbiology & General Principles of Food Hygiene

(15 marks)

1. General principles of food micro-biology and over view of food borne pathogens
2. Over view of sources of micro-organisms in food chain (raw materials, water, air, equipment etc.) and microbiological quality of foods
3. Microbial food spoilage and Food borne diseases
4. General principles and techniques in micro-biological examination of foods
5. Overview of beneficial micro-organisms and their role in food processing and human nutrition
6. General principles of food safety management systems including traceability and recall – sanitation, Hazard Analysis & Critical Control Point (HACCP), Good production and processing practices (Good Manufacturing Practices(GMP), Good Agriculture Practices(GAP),Good Hygiene Practices(GHP), Good Laboratory Practices(GLP), Best Aquaculture Practices(BAP) etc)</td>
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<td>36</td>
<td>Official Language Department</td>
<td>(ZK) Official Language Department</td>
<td>Junior Translation Officer</td>
<td><u>Scheme of Examination:-</u>
<table>
<tr><th>Part</th><th>Mode of Paper</th><th>Subject</th><th>Number of Questions/ Maximum Marks</th></tr>
<tr><td>Paper- I (Objective Type)
(Tier-1)</td><td>Computer Based Mode</td><td>i) General Hindi
ii) General English</td><td>100/ 100

100/ 100</td></tr>
<tr><td>Paper- II
(Tier-2)</td><td>Descriptive</td><td>Translation & Essay</td><td>200 marks</td></tr>
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				Indicative Syllabus: * **Paper-I (Computer Based Examination)**: The questions will be designed to test the candidates' understanding of the languages and literature, correct use of words, phrases and idioms and ability to write the languages correctly, precisely and effectively. The questions will be as per Degree level. * **Paper-II (Translation and Essay):** This paper will contain two passages for **translation** - **one passage for translation from Hindi to English and one passage for translation from English to Hindi, and an Essay each in Hindi and English,** to test the candidates' translation skills and their ability to write as well as comprehend the two languages correctly, precisely and effectively. **The level of the paper will be consistent with the educational qualifications prescribed.** * **The Candidate who qualify the Paper –I (Tier-1) examination will only be allowed to appear in the Paper-II (Tier-2).** ➢ Paper-I will consist of Objective Type Multiple choice questions only. Based on the marks scored in the Paper-I; i.e., Computer Based Examination, candidates will be shortlisted, category-wise, to appear in Paper-II (Descriptive Paper). ➢ There will be negative marking of 0.25 marks for each wrong answer in Paper-I. Candidates are, therefore, advised to keep this in mind while answering the Question. ➢ Marks scored by the candidates in Computer Based Examination, if conducted in multiple shifts, will be normalized by using the procedure published by the Recruitment agency and such normalized scores will be used to determine final merit and cut-off marks. ➢ Tentative Answer Keys of Computer Based Examination will be placed on the website of Andaman & Nicobar Administration after the Examination. ➢ The Final Answer Keys will be used for processing the result of Computer Based Examination and the same will be uploaded on the website of the A & N Administration after the declaration of result of Computer Based Examination.