Plan of Written Examination

All the aspirants are informed as under with respect to the written test to be conducted for the recruitment for the post of **Junior Engineer (Civil) and Junior Engineer (Public Health) in (Advt No. 10 of 2023)** :-

1. *The Exam will be conducted in MCQ (Multiple Choice Questions) format. OMR sheet will be used for answering the questions.*
2. *The Exam would be of 2 hours duration.*
3. *The Exam will consist of two parts (Part A and Part B) as follows:-*

Part	Topic	No. of Questions	Marks (Each Question carries 1 mark)	Type of Questions
A	Questions from General Knowledge and Current Affairs, Punjab History and Culture, Logical Reasoning and Mental ability, Punjabi, English, ICT, (Annexure-1)	40	40	MCQs (Multiple Choice Questions)
B	Questions from the Subject (Annexure-2	80	80	MCQs (Multiple Choice Questions)
Total		120	120	

4. ***There will be negative marking. Each question carries 1 mark. For every wrong answer, 1/4th mark i.e. 0.25 mark would be deducted. The question(s) not attempted will receive no credit or discredit.***

5. *Tentative syllabus for the written examination for the recruitment of* **Junior Engineer (Civil) and Junior Engineer (Public Health) in (Advt No. 10 of 2023)** *is annexed at Annexure-1 and Annexure-2.*

Annexure - 1

Part A - General Knowledge, *Punjab History and Culture,* Logical Reasoning Mental Ability, Punjabi, Englidh and ICT.

Sr. No.	***Indicative Contents of Syllabus***	***Weightage (Approx.)***
1.	***General Knowledge and Current affairs of National and International importance including:*** *(i) Polity issues,* *(ii) Environment issues,* *(iii) Current Affairs,* *(iv) Science and Technology,* *(v) Economic issues,* *(vi) History of India with special reference to Indian freedom struggle movement.* *(vii) Sports,* *(viii) Cinema and Literature.* *(ix) Geography*	*10*
2.	***Punjab History and Culture:-*** *Physical features of Punjab and its ancient history. Social, religious and economic life in Punjab. Development of Language & literature and Arts in Punjab, Social and culture of Punjab during Afgan/Mughal Rule, Bhakti Movement, Sufism, Teachings/History of Sikh Gurus and Saints in Punjab. Adi Granth, Sikh Rulers, Freedom movements of Punjab.*	*5*
3.	***Logical Reasoning & Mental Ability:*** *(i) Logical reasoning, analytical and mental ability.(05 Marks)* *(ii) Basic numerical skills, numbers, magnitudes, percentage, numerical relation appreciation. (03 Marks)* *(iii) Data analysis, Graphic presentation charts, tables, spreadsheets. (02 Marks)*	*10*
4.	***ਪੰਜਾਬੀ:-*** **ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ, ਸ਼ਬਦਜੋੜ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ, ਸਮਾਨਾਰਥਕ/ਵਿਰੋਧੀਸ਼ਬਦ, ਨਾਂਵ, ਪੜਨਾਂਵ ਅਤੇ ਕਿਰਿਆ ਦੀਆਂ ਕਿਸਮਾਂ ਤੇ ਸਹੀ ਵਰਤੋਂ, ਲਿੰਗ ਅਤੇ ਵਚਨ, ਪੰਜਾਬੀ ਅਖਾਣ ਤੇ ਮੁਹਾਵਰੇ, ਅੰਗਰੇਜੀ ਤੋਂ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਅਤੇ ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਦੀ ਥਾਂ ਇੱਕ ਸ਼ਬਦ ਆਦਿ।**	*5*
5.	***English:-*** *Basic Grammar, Subject and Verb, Adjectives and Adverbs, Synonyms, Antonyms, One Word Substitution, Fill in the Blanks, Correction in Sentences, Idioms and their meanings, Spell Checks, Adjectives, Articles, Prepositions, Direct and Indirect Speech, Active and Passive Voice, Correction in Sentences, etc.*	*5*
6.	***ICT:-*** *Basics of computers, Network & Internet, Use of office productivity tools Word, Excel, Spreadsheet & PowerPoint.*	*5*
	Maximum Marks	**40**

Annexure-2

(Part B)

Subject Syllabus (Junior Engineer (Civil) and Junior Engineer (Public Health)

Number of Questions - 80 **Maximum Marks- 80**

1) ENGINEERING DRAWING: Lettering Technique and Practice, Dimensioning Techniques (Necessity of dimensioning, method and principles of dimensioning etc.), Scales (need and importance of scales. Drawing of plain and diagonal scales etc.), Projections, Sections, Symbols and Conventions.

2) APPLIED MECHANICS: Introduction, Laws of forces, Moment, Friction, Centre of Gravity etc.

3) FLUID MECHANICS: Introduction, Properties of Fluids, Hydrostatic Pressure, Measurement of Pressure, Fundamentals of Fluid Flow (Types of Flow, Discharge, hydraulic energy, Bernoulli's theorem etc.), Flow Measurements (brief description with simple numerical problems, Venturimeter, Pitot tube, Orifice, Current meters, Notches etc.), Flow through Pipes (Definition of pipe flow; Reynolds number, laminar and turbulent flow, Critical velocity and velocity distributions in a pipe for laminar flow, Head loss in pipe lines, Hydraulic gradient line and total energy line, Pipes in series and parallel, Water hammer phenomenon etc.), Flow through open channels (uniform and non-uniform flow, discharge through channels using Chezy's formula and Manning's formula, Most economical sections, rectangular, trapezoidal and circular etc.), Hydraulic Pumps and motors (types, uses and efficiency etc.)

4) SURVEYING: Basic principles of surveying, Concept and purpose. Instruments used for taking these measurements etc, Chain surveying, Compass surveying, Levelling, Planc Table Surveying, Total Station Method, Auto Level, Contouring, Theodolite Surveying, Tacho-metric surveying, Curves, Digital Survey, Introduction to the use of Modern Surveying equipment and techniques, Total Stations etc.

5) CONSTRUCTION MATERIALS & BUILDING CONSTRUCTION: General characteristics of stones, Requirements of good building stones, Identification of common building stones, Bricks and Tiles, Cement (Various types of Cements, Properties of cement etc.), Lime, Timber and Wood Based Products, Paints and Varnishes, Miscellaneous Materials etc., Introduction to Building Construction, Foundation, Walls, Masonry, Arches and Lintels, Doors, Windows and Ventilators, Damp Proofing and Water Proofing, Floors, Roofs, Stairs, Anti Termite Measures, Building Planning etc. Concrete, uses of concrete in comparison to other building materials, Ingredients of Concrete. Properties of Concrete, proportioning for Normal Concrete, Introduction to Admixtures for improving performance of concrete, Special Concretes (Concreting under special conditions, difficulties and precautions before, during and after concreting, Ready mix concrete, Fibre reinforced concrete, Polymer Concrete, Fly ash concrete, Sillica fume concrete etc.), Concreting Operations (Storing of Cement, Storing of Aggregate, Batching, Mixing, Transportation of concrete, Placement of concrete, Compaction, Curing, Jointing, Defects in concrete etc.).

6) STRUCTURAL ENGINEERING: Simple stresses and strains, Elasticity, Hooke's Law, Moduli of Elasticity and Rigidity. Stresses and strains of homogeneous materials and

composite sections. Types of beams and supports and loads, Concept of bending moment and shear force. Bending moment and shear force diagrams for simple cases. Deflection in beams, Moment area theorem, Bending and shear stresses in circular, rectangular, T and L sections, Introduction to I.S:456 (latest edition), Design of singly and doubly Reinforced beams, Design of Columns-Types of Columns. Short and long column, load carrying capacity, effective length of column, lateral and helical ties. I.S. Specifications for reinforcement detailing. Design of slabs types of slabs, one way slab, two way slab, I.S. specifications for Reinforcement detailing method of design as per I.S. code. Design of foundations-isolated footing rectangular footing, square footings, circular footings. Design of tension members in structural steel, gross area, net area, tension splice, Design of compression members, columnsplice, load carrying capacities. Design of beams in structural steel, Basic concept of prestressed concrete, advantages of prestressed concrete in comparison with RCC application of prestressed to various building elements, bridges, water tanks and precast elements, Materials, Prestressing Methods, Bending and Shear Capacity, Losses in Prestressing etc.

7) EARTHQUAKE RESISTANT BUILDING CONSTRUCTION: Elements of Engineering Seismology. Performance of building during earthquakes and Mode of failure, Special construction method, tips and precautions to be observed while planning, designing and construction of earthquake resistant building, Introduction to IS: 4326, IS: 13828, IS: 1893(Part 1), 154326 and IS: 13920 (latest edition), Seismic Provision of Strengthening and Retrofitting Measures for Traditionally- Built Constructions, Brick and RCC Structures, Provision of reinforcement detailing in masonry and RC constructions.

8) WATER SUPPLY AND WASTE WATER ENGINEERING: Water Supply- Water requirement, Rate of demand and supply, Per capita consumption, Population Forecasting etc., Physical, Chemical and bacteriological properties, Standard of potable water as per Indian Standard etc.. Water Treatment including Sedimentation, Coagulation, flocculation, Filtration, disinfection of water, chlorination, Water treatment plants, R.O.s etc., Different types of pipes, fire hydrants, water meters their working and uses, Distribution system etc., Laying out Pipes

Waste Water Engineering-Definition of terms in sanitary engineering. Surface drains, Types of sewage, Sewerage, Laying and Construction of Sewers, Sewage characteristics (Properties of sewage as per IS standards), Natural Methods of Sewerage Disposal, Sewage Treatment, BOD, COD, Building Drainage (Different sanitary fittings and installations, Traps, seals, Testing of house drainage etc.), Drains and Sewers, Traps, inspection chamber, Septic Tank and Soak Pit, Bath room and W.C. connections etc.

9) SOIL AND FOUNDATION ENGINEERING: Physical Properties of Soils, Classification and Identification of Soils, Permeability and its importance, Effective Stress, Strength Characteristics of Soils, Compaction, Bearing Capacity of soil, Concept of shallow and deep foundation; types of shallow foundations and their suitability. Factors affecting the depth of shallow foundations, deep foundations, type of piles and their suitability; pile classification on the basis of material, pile group and pile cap etc.

10) TRANSPORTATION ENGINEERING: Introduction of Transportation Engineering, Traffic Engineering, Road materials, Geometric design. Design of flexible and rigid

pavements, Road maintenance, Railway Engineering Rails, Sleepers, ballast. points and crossing, Track laying and track maintenance.

11) IRRIGATION ENGINEERING: Introduction to irrigation, methods of irrigation, tube well irrigation, tank irrigation, sprinkler irrigation, drip irrigation, water logging, design of irrigation canals and irrigation outlets.

12) ENVIRONMENTAL ENGINEERING: Importance of Environmental Engineering, Water Pollution (Causes lakes and its preventing measure, BIS standards for water quality etc.), Air Pollution, Noise Pollution, Effects of mining, blasting and deforestation, Land Use (land use and natural disasters, landslides etc.) soil degradation problems - erosion, water logging, soil pollution etc.), Environmental Impact Assessment, Legislation to Control Environmental Pollution (Indian legislative acts for water, land and air pollution control provisions, scope and implementation etc.), Renewable Source of Energy etc. of rates (CSR)

13) QUANTITY SURVEYING AND VALUATION: Introduction to quantity surveying and its importance, duties of quantity surveyor, types of estimates, measurement, preparation of detailed and abstract, estimates from drawings, calculation of quantities of materials, analysis contractorship, preparation of tender document based on Common Schedule of Rates (CSR).

14) REPAIR AND MAINTENANCE OF BUILDINGS: Need for maintenance, agencies causing deterioration (sources, causes, effects), investigation and diagnosis of defects, defects and their root causes, materials for repair, maintenance and protection, remedial measures for building defects, surface preparation techniques for repair, crack repair methods, repair of surface defects of concrete, repair of corrosion in RCC elements, repair of DPC against rising dampness, repair of walls, waterproofing of wet areas and roofs, repair of joints in buildings etc.

15) CONSTRUCTION MANAGEMENT AND ACCOUNTS: Construction Planning, CPM, PERT, site organization, Construction Labour (Labour Welfare Fund Act 1936 (as amended), Payment of Wages Act 1936 (as amended), Minimum Wages Act 1948 (as amended), control of progress, inspection and quality control, accidents and safety in construction, accounts, public work accounts, request for quotation, bill of quantities, measurement book, indent book, material at site register.

16) BASICS OF MANAGEMENT: Introduction, Leadership, Motivation, Ethics and Values, Team related skills sympathy, empathy, co-operation, concern, lead and negotiate, work well with people from culturally diverse background, Communication in group conversation and listening skills, Task Initiation, Task Planning, Task execution, Task close out, Customer Relationship Management (CRM), Need, various types of customers, customer satisfaction, life- long customer, Customer Satisfaction Index (CSI) and its significance, Elementary knowledge of Income Tax, Sales Tax, Excise Duty, Provident Fund, Employees State Insurance Act, Labour welfare schemes, Labour laws, worker and public safety techniques, systems of wage payment, incentives, Factory Act 1948 with special reference to health, safety and welfare measures, working hours, annual leave with wages, Payment of Wages Act 1936, Minimum Wages Act 1948, safeguards in construction practices, Introduction to Total Quality Management (TQM),

Community Participation in Water Supply and Sanitation, Roll of Women in Water Supply and Sanitation etc.