# भर्ती परीक्षा हेतु पाठ्यक्रम

## [पद–हैण्डपंप तकनीशियन)]

## लोक स्वास्थ्य यांत्रिकी विभाग

कुल अंक–100

### भाग–I

### सामान्य अध्ययन (अंक– 25)

कुल प्रश्न 25 प्रत्येक 01 अंक

**अ. सामान्य ज्ञान** **अंक– 10**

1. हाई स्कूल स्तर तक का सामान्य विज्ञान
2. हाई स्कूल स्तर तक का भारत का भूगोल
3. हाई स्कूल स्तर तक का सामान्य गणित
4. सम सामायिक राष्ट्रीय महत्व के घटनाक्रम
5. खेल–राष्ट्रीय स्तर की खेल पर सामान्य प्रश्न
6. सामान्य बौध्द्धिक योग्यता–हाई स्कूल स्तर तक का विश्लेषण एवं तार्किक योग्यता

**ब. छत्तीसगढ़ का सामान्य ज्ञान** **अंक– 15**

1. छत्तीसगढ़ का इतिहास, स्वतंत्रता आंदोलन में छत्तीसगढ़ का योगदान
2. छत्तीसगढ़ का भूगोल, जलवायु, जनगणना, पुरातत्विक, दार्शनिक एवं पर्यटन स्थल
3. छत्तीसगढ़ का साहित्य, कला एवं संस्कृति, मुहावरें, हाना, एवं लोकोक्तिंया
4. छत्तीसगढ़ की जनजातियां, बोली/भाषा, विशेष परम्परायें तीज, व्यंजन/पकवान, पर्व एवं त्यौहार
5. छत्तीसगढ़ की अर्थव्यवस्थावन, कृषि एवं वर्षा
6. छत्तीसगढ़ का प्रशासनिक ढांचा, स्थानीय शासन एवं पंचायतीय राज तथा स्थानीय खेलकूद
7. छत्तीसगढ़ में उद्योग, उर्जा, जल एवं खनिज संसाधन
8. छत्तीसगढ़ की सम समायिक घटनायें

## भाग–II
## तकनीकी कौशल (अंक–75)
## कुल प्रश्न 75 प्रत्येक 01 अंक

**A- General Departmental Basic Knowledge** अंक– 10

1. Importance of water for human being.
2. Type of Rigs Machine use for drilling.
3. Type of Tube wells.
4. Installation and Maintenance Of India Mark 2 Hand pump.
5. Construction of Unicef Type Plate form.
6. Water Quality as per IS;10500.
7. Disinfection of water.
8. Packaged drinking water.
9. Departmental Schemes.
10. Basic Knowledge of JJM (Jal Jeevan Mission).
11. Pipes and pipe fitting-commonly used pipes. Pipe schedule and standard sizes. Pipe bending Methods. Use of bending fixture, pipe threads-Std. Pipe threads Die and Tap, pipe vices. Use of tools such as pipe cutters, pipe wrenches; pipe dies, and tap, pipe bending machine etc. Standard pipe fitting- Methods of fitting or replacingthe above fitting, repairs and erection on rain water drainage pipes and house hold tap sand pipe work. Inspection & Quality control Basic SPC Visual Inspection.

**B- Industrial Training Skill Knowledge–** **Marks– 65**

**Importance of safety and general precautions:-** Importance of safety and general precautions observed in the industry/shop floor. Introduction of First aid. Operation of electrical mains and electrical safety. Introduction of PPEs; Response to emergencies e.g.; power failure, fire, and system failure.

**Importance of housekeeping & good shop floor practices.** Introduction to 5S concept &its application.

**Occupational Safety &Health:-** Health, Safety and Environment guide lines, legislations & regulations as applicable. Basic understanding on Hot work, confined space work and material handling equipment. Linear measurements- its units, dividers, calipers, hermaphrodite, centre punch, dot punch, prick punch their description and uses of different types of hammers. Description, use and care of 'V' Blocks, marking off table.Measuring standards(English, Metric Units), angular measurements

**Bench vice construction:-** types, uses, care& maintenance, vice clamps, hacksaw frames and blades, specification, description, type sand their uses, method of using hacksaws.

**Files-** specifications, description, materials, grades, cuts, file elements, uses. Types of files, care and maintenance of files. Marking media, marking blue, Prussian blue, red lead, chalk and their special application, description.

**Metal :-** Physical properties of engineering metal: colour, weight, structure, and conductivity, magnetic, fusibility, specific gravity. Mechanical properties: ductility, malleability hardness, brittleness, toughness, tenacity, and elasticity.

**Power Saw:-** band saw, Circular saw machines used for metal cutting.

**Micrometer:-** outside and inside -principle, constructional features, parts graduation, reading, use and care. Micrometer depth gauge, parts, graduation, reading, use and care.

**Digital micrometer:-** Vernier calipers, principle, construction, graduations, reading, use and care. Digital Vernier Caliper. Vernier height gauge material construction, parts, graduations {English & Metric) uses, care and maintenance. Drilling processes: common type (bench type, pillar type, radial type), gang and multiple drilling machine.

**Solder and soldering:-** Introduction-types of solder and flux. Composition of various types of solder's and their heating media of soldering iron. Method of soldering, selection and application-joints. Hard solder-introduction, types and method of brazing.

**Safety:-** importance of safety and general precautions observed in welding shop. Precautions in electric and gas welding. (Before, during, after) introduction to safety equipment and their uses Machines and accessories, welding transformer, welding generators.

**Welding hand tools:-** Hammer, welding description, types and uses, description, principle, method of operating carbon dioxide welding. H.P. welding equipment: description, principal method of operating L.P. welding equipment: description, principal, method of Operating, Types of Joints-Butt and fillet as per BIS SP 46-1988 specifications. Gases and gas cylinder description, kinds difference and uses. Setting up parameters for ARC welding machines-selection of welding electrodes. Care to be taken in keeping electrode. Oxygen acetylene cutting- machine description, parts, uses method of handling. Cutting torch descriptions parts, function and uses.

**Drill :-**material types, (Taper) shank, straight shank) parts and sizes. Drill angle-cutting angle for Different materials, cutting speed feed. R.P.M. for different materials. Drill holding devices-material, Construction and their uses.

**Taps** - British standard (B.S.W., B.S.F., B.A.&B.S.P.) and metric /BIS (coarse and fine) material, parts (shank body, flute, cutting edge).

**Tap wrench:-** material, parts, types (solid & adjustable types)and their uses removal of broken tap, studs (tap studs extractor). Dies:-British standard, metric and BIS standard, material, parts, types.

**Method of using dies.** Diestock: material, parts and uses.

**Gauges-** introduction, necessity, types. Limit gauge: Ring gauge, snap gauge, plug gauge, description and uses. Description and. Uses of gauge-types (feeler, screw, pitch, radius, wire' gauge).

**Levers and Simple machines:-**

Levers and Simple machines- Lever and its types.

**Inter change ability:** Necessity in Engg, field definition, BIS. Definition, types of limit, terminology of limits and fits-basic size, actual size, deviation, high and low limit, zero line, tolerance zone Different standard systems off its and limits. British standard system, BIS system. Method of expressing tolerance as per BIS Fits: Definition, types, description of each with sketch. Vernier height gauge: material construction, parts, graduations (English & Metric) uses, care and maintenance.

**Lathe:-**Safety precaution to be observed while working on a lathe, Lathe specifications, and constructional features. Lathe main parts descriptions- bed, head stock, carriage, tail stock, feeding and thread cutting mechanisms. Holding of job between centers, works with catch plate, clog, simple description of a facing and roughing tool and their applications.

**Maintenance:-**

Total productive maintenance Autonomous maintenance Routine maintenance, Maintenance schedule Retrieval of data from machine manuals Preventive maintenance- objective and function of Preventive maintenance, section inspection. Visual and detailed, lubrication survey, system of symbol and colour coding. Revision, simple estimation of materials, use of hand books and reference table. Possible causes for assembly failures and remedies. Installation, maintenance and overhaul of machinery and engineering equipment. Assembling techniques such as aligning, bending, fixing, mechanical jointing, threaded jointing, sealing, and torqueing. Dowel pins: material, construction, types, accuracy and uses.

**Screws:**-material, designation, specifications, Property classes (e.g. 9.8 on screw head), Toots for tightening/ loosening of screw or bolts; Torque wrench, screw joint calculation uses.

**Screw threads:-** terminology parts, types and their uses. Screw pitch gauge: material part sand uses. Power tools: its constructional features, uses& maintenance.

**Locking device:** Nuts- types (lock nut castle nut, slotted nuts, swam nut, grooved nut) Description and use.

**Key:-** Various types of keys, allowable clearances & tapers, types, uses of key pullers. Special files: types (pillar, Dread naught, Barrow, warding) description & their uses.

**Surface finish:-**importance, equipment for testing-terms relation to surface finish. Equipment for tasting surfaces quality –dimensional tolerances of surface finish. The importance of keeping the work free from rust and corrosion.

**Coatings:-** The various coatings used to protect metals, protection coat by heat and electrical deposit treatments. Treatments to provide a pleasing finish such as chromium silver plating, nickel plating and galvanizing. Gauges and type of gauge commonly used in gauging finished product. Method of selective assembly 'Go' system of gauges, hole plug basis of standardization.

**Bearing:-**Introduction, classification (Journal and Thrust), Description of each, ball bearing: Single row, double row, description of each, and advantages of double row. Roller and needle bearings: Types of roller bearing. Description & use of each. Method of fitting ball and roller bearings Bearing metals -types, composition and uses. Synthetic materials for bearing: The plastic laminate materials, their properties and uses in bearings such as phenolic, Teflon polyamide (nylon).

**Washers-**Types and calculation of washer sizes. The making of joints and fitting packing.

**Lubrication and lubricants:-** purpose of using different types, description and uses of each type. Method of lubrication. A good lubricant, viscosity of the lubricant, Main property of lubricant. How a film of oil is formed in journal Bearings. Foundation bolt types (Lewis cotter bolt) description of each erection tools, pulley block, crowbar, spirit level; Plumb bob, wire rope, manila rope, wooden block.

**Lifting appliances:-**The use of lifting appliances, extractor presses and their use. Practical method of obtaining mechanical advantage. The slings and handling of heavy machinery, special precautions in the removal and replacement of heavy parts.

**Engineering Drawing :-**

Introduction to Engineering Drawing and Drawing Instruments – Conventions, Sizes and layout of drawing sheets Tiles Block, its position and content Drawing instrument.

Dimensioning, Symbolic representation, Concepts and reading of drawing.

**Workshop Calculation and Science:-**

**Unit, Fractions-**

Classification of unit system,

fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units Measurement units and conversion, Factors, HCF, LCM and problems

Fractions- Addition, subtractions, multiplication and division

Decimal fraction-Addition, subtraction, multiplication and division.

**Square root Ratio and Proportions, Percentage :-**

Square and square root

Applications of Pythagoras theorem and related problems Ration and proration.

Ratio and proportion- Direct and indirect proportions.

Percentage- Percentage Changing percentage to decimal and fraction.

**Material Science:-**

Types metals, types of ferrous and non ferrous metals.

Physical and mechanical properties of metals.

Introduction of iron and cast iron.

Difference between iron & steel, alloy steel and carbon steel properties and uses of rubber, timber and insulating materials.

**Mass, Weight, Volume and Density.**

Mass, volume, density, weight and specific gravity.

Related problems for mass, volume, density, weight and specific gravity.

**Speed and Velocity, Work, Power and Energy :-**

Speed and velocity- Rest, motion, speed, velocity, difference between speed and velocity, acceleration and retardation.

Speed and velocity- Related problem on speed and velocity Work, Power, energy , HP, IHP, BHP and efficiency.

Potential energy, kinetic energy and related problems with assignment.

**Mensuration:-** Surface area and volume of solids- cube, cuboid, cylinder, sphere and hollow cylinder.