BHEL ARTISAN 2026

Complete Trade-wise Syllabus & CBT Exam Pattern | ExamDateAlert.com

Important: This guide is based on the previous BHEL Artisan examination pattern and the supplied syllabus. The official 2026 detailed advertisement may revise these details.

CBT Exam Pattern

Section	Questions	Marks
Trade Theory	70	70
Engineering Drawing & Workshop Calculation	30	30
Reasoning	20	20
TOTAL	120	120

• Duration: 90 minutes total

• Question type: Objective MCQs

• Correct answer: +1 mark | Wrong answer: -0.25 mark

• Exam languages: English, Hindi and one chosen regional language; Electronics Mechanic and Foundryman: English and Hindi only.

• In case of a language discrepancy, the English version is final.

• Prohibited items: Calculators, smart devices and reference materials.

Trade-wise Detailed Syllabus

1. Electrician Trade

Trade Theory (70 marks)

• Basic electrical engineering: Ohm's law, Kirchhoff's laws, resistance, conductance, power, energy, efficiency, series and parallel circuits, AC/DC circuits, electrical units and measurements.

• Electrical machines: DC, induction and universal motors; transformers (principle, types, applications); alternators and generators; motor starters and speed control.

• Wiring and installation: Cleat, casing-capping and conduit wiring; accessories and symbols (MCB, DB, fuse); single-line and schematic diagrams; fault finding in domestic and industrial wiring; earthing techniques.

• Tools, safety and maintenance: hand tools, PPE, electrical safety (shock prevention, fire hazards), preventive and breakdown maintenance.

• Electrical drawing and reading: circuit diagrams, panel wiring diagrams, electrical symbols.

• Measuring instruments: multimeter, megger, voltmeter, ammeter, wattmeter, energy meter, clamp meter (usage and precautions).

• Earthing and grounding: purpose and methods, pipe/plate/rod earthing, earth resistance (permissible values and testing).

• Fundamentals of electronics: diodes, rectifiers, LEDs, basic transistor function, relays and contactors.

• Batteries and UPS: battery types, charging methods, safety; inverter and UPS working and applications.

• Industrial electricals: basics of PLC and control panels, HT/LT industrial motors, electrical machines manufactured by BHEL.

Engineering Drawing & Workshop Calculation (30 marks)

• Engineering drawing: reading electrical signs, symbols, circuit diagrams, layout drawings, wiring diagrams and earthing diagrams; sketching electrical components; drawing circuit diagrams and the schematic of plate and pipe earthing; block diagrams of instruments and equipment.

• Workshop calculation: units, fractions, square root, ratio and proportion, percentage; algebra and theory of indices; mensuration (area and perimeter of square, rectangle, parallelogram, triangle); profit and loss, simple and compound interest; estimation and costing; material science (ferrous and non-ferrous metals); heat, temperature and pressure; elasticity (stress, strain, Young's modulus).

2. Electronics Mechanic Trade

Trade Theory (70 marks)

(A) Tools, cables and measurement

• Hand tools and their uses (filing, hacksawing, fitting, drilling, basic metalwork).

• Basics of AC and electrical cables; single-range meters, continuity, voltage and current measurement.

• Cells and batteries: terminals, voltage, charging and discharging, types and specifications.

• AC and DC measurements using multimeter, CRO/DSO and function generator; Digital Storage Oscilloscope features and applications.

(B) Soldering, SMD and PCB work

• Soldering and de-soldering, PCB track repair, switches and switch panel boards.

• Basic SMD (2, 3 and 4 terminal components); SMD soldering and de-soldering; SMT equipment such as pick-and-place machines and reflow ovens.

• PCB rework, solder joint defects, damaged tracks and pads, ESD prevention.

• Electronic cables and connectors, PC and network cable setups.

(C) Components and analog electronics

• Active and passive components; Ohm's and Kirchhoff's laws; RC and resonance circuits.

• Power supply circuits and rectifiers; IC regulators (78/79 series, LM317T, IC723).

• Transistors and amplifiers (biasing, configurations, gain, feedback).

• Oscillators (Colpitts, Hartley, RC phase shift, crystal) and astable, monostable and bistable multivibrators.

• Wave shaping circuits: clippers, clampers, Zener peak clippers.

• Power electronic components: FET, SCR, TRIAC, UJT; MOSFET and IGBT.

• Opto electronics: LEDs, photodiodes, phototransistors, opto-isolators.

• Op-amp and Timer 555 applications; analog IC applications using ICs 741, 723, 555, 7106 and 7107.

(D) Digital electronics

• Basic gates, truth tables, number systems.

• Combinational circuits: adders, subtractors, decoders, encoders, multiplexers, demultiplexers.

• Flip-flops (RS, D, T, JK) and latches.

• Digital IC applications and digital panel meters (LED/LCD displays, seven-segment displays, multiplexing).

(E) Communication, control and IoT

• Communication electronics: AM/FM modulation and demodulation, transmitters, receivers, antennas.

• Fibre optic communication.

• Microcontroller 8051 (ports, timers, architecture, memory, registers; introduction to PIC).

• Sensors and transducers used in IoT applications.

(F) Protection and power systems

• Protection devices: fuses, MCBs, ELCBs, contactors, relays; DC and stepper motor control.

• SMPS and inverters; UPS; solar power systems; LED lights; LCD and LED TV repair basics.

Engineering Drawing & Workshop Calculation (30 marks)

• Engineering drawing: drawing instruments and conventions, sheet sizes and title block, freehand sketching of figures and tools, types of lines, geometrical figures, lettering and numbering, electronic circuit diagrams and layout drawings, electronic symbols and components, block diagrams.

• Workshop calculation: units, fractions, square root, ratio and proportion, percentage; algebra and theory of indices; estimation and costing; material science; heat, temperature and pressure; trigonometry.

3. Fitter Trade

Trade Theory (70 marks)

(A) Marking, measuring and hand tools

• Marking-off and layout tools, dividers, scribing block, trammel, try square, depth gauge, protractor.

• Cold chisels (materials, types, cutting angles); power saw, band saw and circular saw used for metal cutting.

• Micrometers (outside, inside, depth, digital), vernier calipers, vernier bevel protractor, dial and digital calipers, vernier height gauge.

• Templates and gauges: radius/fillet gauge, feeler gauge, hole gauge.

(B) Drilling, reaming, threads and grinding

• Drilling processes and machines (bench, pillar, radial, gang, multiple); tap drill size; drill types, angles, cutting speed, feed, RPM, holding devices, troubles and remedies; countersink, counterbore, spot facing.

• Reamers: types, parts, hole size, reaming procedure.

• Screw threads: terminology, types, pitch gauge, taps (BSW, BSF, BA, BSP and metric/BIS).

• Grinding wheels: abrasive, grade, bond, specification, mounting, dressing, selection; bench grinder.

(C) Sheet metal and welding basics

• Tinman's tools, snips, hammers and mallets, sheet and wire gauge, hand grooves.

• Welding safety, welding transformers and generators, welding hand tools, carbon dioxide welding.

• High-pressure and low-pressure welding equipment; butt and fillet joints as per BIS SP:46-1988; gases and cylinders; electrode selection; oxygen-acetylene cutting.

(D) Limits, fits and maintenance

• Interchangeability, BIS and British systems, limits and fits terminology (basic size, deviation, tolerance zone).

• Maintenance: total productive maintenance, autonomous, routine and preventive maintenance, lubrication survey, colour coding, installation and overhaul of machinery, causes of assembly failures.

(E) Heat treatment and gauging

• Normalising, annealing, hardening, tempering, tempering colour chart.

• Case hardening and carburising (solid, liquid, gas).

• Gauges for finished products, selective assembly, "Go/No-Go" gauge system, hole and plug basis of standardisation.

Engineering Drawing & Workshop Calculation (30 marks)

• Engineering drawing: instruments and conventions, sheet layout, title block, freehand sketching, types of lines, geometrical figures, lettering; reading dimensions and dimensioning practice (arrowheads, leader lines, unidirectional and aligned dimensioning); axes, planes and quadrants; orthographic and isometric projection; first-angle and third-angle methods; trade symbols.

• Workshop calculation: units, fractions, square root, ratio and proportion, percentage; algebra; mensuration (area and perimeter of plane figures, surface area and volume of solids, capacity of vessels); levers and simple machines (mechanical advantage, velocity ratio, efficiency); trigonometry; centre of gravity; area of cut-out regular and irregular surfaces; elasticity (ultimate and working stress); heat treatment processes; estimation and costing.

4. Foundryman Trade

Trade Theory (70 marks)

• Foundry basics: principles, types, advantages of metal castings, quality assurance.

• Gating system: elements, types, functions, risers, feeders, fluxes, chills, directional solidification, exothermic materials.

• Sand and testing: types of sand, moisture content test, permeability test; moulding sand properties (porosity, permeability, collapsibility) and ingredients.

• Moulds and moulding: green sand and dry sand moulds, mould parts (pouring basin, ingate, cope), bench and floor moulding, hand-operated and power-operated machine moulding, mould coatings, core removal, cleaning and inspection of castings.

• Casting processes: pressure die casting, resin bonded sand mould casting, CO2 moulding, non-ferrous metal casting.

• Patterns and tools: types of patterns; marking, measuring and other foundry tools.

• Furnaces: melting and refining furnaces (induction furnace, VAD), melting charge calculation for cast iron and steel, heat treatment furnaces (normalising, tempering).

• Metallurgy: iron-carbon equilibrium diagram, phases and microstructure of carbon steel.

• Safety: causes of accidents and fire, PPE.

Engineering Drawing & Workshop Calculation (30 marks)

• Workshop calculation: units, fractions, square root, ratio and proportion, percentage; material science; mass, weight, volume and density; work, power and energy; mensuration; levers and simple machines; trigonometry.

• Engineering drawing: drawing conventions, sizes and scales; 2D and 3D drawing instruments; orthographic and isometric projections, sectional and assembly views; types of lines and freehand drawing; geometrical figures; dimensioning and tolerances; reading engineering drawings; symbols such as surface roughness, cylindricity and concentricity.

5. Machinist Trade

Trade Theory (70 marks)

(A) Tools and measurement

• Drills, taps, dies and threading tools; tap drill size; screw thread terminology; reamers.

• Vernier height gauge, vernier caliper, outside and vernier micrometer, depth and inside micrometer, bore dial gauge, telescopic gauge.

• Interchangeability, limits and fits (British and BIS systems).

(B) Machines and processes

• Drilling machines: pillar and radial drills, countersinking, counterboring, spot facing, cutting speed, feed, drilling time.

• Slotter machine: classification, driving mechanism, quick return, job holding, tools, splines.

• Milling: types, parts, cutters, operations, up and down milling, attachments; vertical milling and boring.

• Grinding: wheel types, bonds, grade, marking, dressing, glazing, defects; surface grinding; cylindrical grinding; tool and cutter grinder.

(C) Materials, tooling and gears

• Coolants and lubricants; jigs and fixtures; machinability and metal properties.

• Heat treatment and indexing (direct and simple indexing).

• Cutting tools and geometry, tool materials, tool life, cutting parameters.

• Spur gear elements and tooth forms; helical, bevel and worm gear and cam calculations; types of keys; gear testing and errors.

(D) CNC and VMC

• CNC and VMC basics: comparison with conventional machines, accuracy, repeatability, CNC elements, feedback systems.

• CNC programming: absolute and incremental modes, G and M codes, canned cycles, subprograms.

• Program writing and verification, process planning, tool offsets, machine modes (jog, MDI, MPG), emergency stop functions.

• CNC collisions, tool wear and recovery, program transfer, downtime, machine hour rate and cost calculation.

Engineering Drawing & Workshop Calculation (30 marks)

• Engineering drawing: drawing instruments and conventions, sheet layout, title block, lines, freehand sketching, geometrical figures, single-stroke lettering, dimensioning, trade symbols, axes, planes and quadrants, orthographic and isometric projections, first-angle and third-angle methods, reading job drawings.

• Workshop calculation: units, fractions, square and square root, ratio and proportion, percentage (including conversion to decimals and fractions); Pythagoras theorem; mass, weight, volume and density; work, power, energy, HP, IHP, BHP and efficiency; heat, temperature and pressure (units, atmospheric, absolute and gauge pressure); basic electricity (AC, DC, voltage, resistance); trigonometry.

6. Turner Trade

Trade Theory (70 marks)

• Workshop safety: safety precautions, PPE, housekeeping.

• Basic machine shop tools: hand tools, marking tools, fitting tools, surface plates, V-blocks and accessories.

• Measuring instruments: vernier caliper, micrometer, height gauge, steel rule, thread gauge, plug gauges, slip gauges, dial gauges.

• Lathe basics: parts, specifications, types of lathes and applications; job mounting techniques, attachments and accessories.

• Turning parameters: cutting speed, feed and depth of cut as per material and operation.

• Lathe operations: centring, facing, turning, taper cutting, threading (screw, square, Acme, buttress), knurling, trepanning, grooving, parting, bevelling, drilling, boring.

• Coolants and lubricants: application methods and benefits.

Engineering Drawing & Workshop Calculation (30 marks)

• Workshop calculation: units, fractions, square root, ratio and proportion, percentage; material science; mass, weight, volume and density; work, power and energy; mensuration; levers and simple machines; trigonometry.

• Engineering drawing: conventions, sizes and scales; 2D and 3D instruments; orthographic and isometric projections, sectional and assembly views; lines and freehand drawing; geometrical figures; dimensioning and tolerances; reading engineering drawings; surface roughness, cylindricity and concentricity symbols.

7. Welder Trade

Trade Theory (70 marks)

(A) Safety, equipment and joints

• Industry safety, elementary first aid, precautions in SMAW and oxy-acetylene cutting.

• Welding equipment and terminology (arc and gas tools, accessories, processes).

• Types of welding joints and applications; preparation and fit-up for various thicknesses; surface cleaning.

(B) Arc welding

• Basic electricity and arc principles; arc characteristics.

• Arc welding power sources: transformer, rectifier, inverter; AC versus DC.

• Arc length and polarity, weld quality, defects, weld gauges.

• Electrodes: types, flux functions, coating factor, storage, moisture effects, baking.

• Welding positions (flat, horizontal, vertical, overhead); BIS and AWS symbols.

(C) Gas welding, cutting, brazing and soldering

• Common gases and flames, flame temperatures, oxy-acetylene flames, gas cutting equipment.

• Acetylene and oxygen handling: calcium carbide hazards, flashback arrestors, cylinder colour codes, single and double stage regulators.

• Low-pressure and high-pressure oxy-acetylene systems, blow pipes, leftward and rightward techniques.

• Gas brazing and soldering, filler rods and fluxes; brazing of copper and brass.

(D) Defects, pipe welding and heat control

• Arc blow, distortion control, arc and gas welding defects with causes and remedies.

• Pipe welding: specifications, joints, all positions, pipe versus plate welding; pipe joint development (elbow, T, Y, branch, manifold).

• Weldability and heating: preheating, post heating, interpass temperature.

Engineering Drawing & Workshop Calculation (30 marks)

• Engineering drawing: drawing instruments and conventions, freehand sketching, types of lines, geometrical figures, lettering, reading dimensions, reading fabrication drawings, sectional views of joints and pipe joints, trade symbols.

• Workshop calculation: units, fractions, square root, ratio and proportion, percentage; algebra and theory of indices; mensuration (area and perimeter of square, rectangle, parallelogram, triangle); profit and loss, simple and compound interest; estimation and costing; material science; heat, temperature and pressure; trigonometry.

Reasoning (20 marks)

The supplied source specifies 20 Reasoning questions but does not provide a topic-wise Reasoning syllabus. Refer to the official detailed notification for the confirmed topics.