30/26

फाइल सं. /File No. 2(13)/2023-Estt.

राष्ट्रीय शर्करा संस्थान/National Sugar Institute

एक आई.एस.ओ. 9001:2015 प्रमाणित संस्थान/AN ISO 9001:2015 Certified Institute

उपभोक्ता मामले, खाद्य एवं सार्वजनिक वितरण मंत्रालय/Ministry of Consumer Affairs, Food & Public Distribution

(खाद्य एवं सार्वजनिक वितरण विभाग)/Department of Food & Public Distribution

(भारत सरकार)/(Government of India)

Advertisement No. 1/2024

Applications are invited for selection by Direct Recruitment at National Sugar Institute, Kanpur. The last date for receiving the applications will be **30 days after publication of advertisement** & the details of posts are as under:-

Name of the Post	UR	SC/ST/ OBC/ EWS	TOTAL	Age limit	Level in the Pay Matrix	Essential Qualification
Fitter 'C'	01 (Ex-Service-man)	-	01	Between 18 and 25 years*	Level-2, Cell-1, Rs. 19,900-63,200/-	**Essential :** (i) 10th standard pass from a recognised school or Board; **and** (ii) Fitter trade certificate from Industrial Training Institute or the Central Industrial Training Institute.
Electrician	01 (Ex-Service-man)	-	01	Between 18 and 25 years*	Level-2, Cell-1, Rs. 19,900-63,200/-	**Essential :** **(i)** 10th standard pass from a recognised school or Board; **and** **(ii)** Trade Certificate in Electrician from Industrial Training Institute or the Central Industrial Training Institute.

(*) **For relaxtion, see our website.**

The candidates willing to apply for the above posts are advised to visit Institute's website https://nsi.gov.in wherein the detailed advertisement along-with instructions and additional details as syllabus for written test, skill test and application proforma to candidates for recruitment by selection have been displayed.

(B.K. Sahu)
Senior Administrative Officer

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फाइल सं0/File No. 2(13)/2023-Estt.

राष्ट्रीय शर्करा संस्थान

NATIONAL SUGAR INSTITUTE

एक आई0एस0ओ0 9001:2015 प्रमाणित संस्थान

AN ISO 9001:2015 Certified Institute

उपभोक्ता मामले खाद्य एवं सार्वजनिक वितरण मंत्रालय

Ministry of Consumer Affairs, Food & Public Distribution

(खाद्य एवं सार्वजनिक वितरण विभाग)

Department of Food & Public Distribution

(भारत सरकार)

(Government of India)

Vacancy Notice

Director, National Sugar Institute, Kanpur invite applications from the eligible candidates for recruitment for the under noted post.

Sl. No	Name of the Post	No. of Post	Level in the Pay Matrix	Essential and other qualification
01.	Fitter 'C'	01-UR (Ex-Serviceman)	Level-2, Cell-1, Rs. 19,900-63,200/-	**Essential-:** (i) 10th standard pass from a recognized school or Board; and (ii) Fitter trade certificate from Industrial Training Institute or the Central Industrial Training Institute.
02.	Electrician	01-UR (Ex-Serviceman)	Level-2, Cell-1, Rs. 19,900-63,200/-	**Essential-:** (i) 10th standard pass from a recognized school or Board; and (ii) Trade certificate in Electrician from Industrial Training Institute or the Central Industrial Training Institute.

Closing Date-: The closing date of receipt of application will be 30 days from the date of publication of the advertisement in the newspaper.

Application Fees: The candidates belonging to Unreserved Category, EWS and OBC category shall be required Rupees Fifty only. [Rs. 50/- (Non-refundable)] as application fee in the form of Indian Postal Order (IPO) in favour of "Director, National Sugar Institute, Kanpur". The fees can also be paid in the form of demand draft drawn in favour of "Director, National Sugar Institute, Kanpur" payable at SBI, Kalyanpur, Kanpur. The candidate must indicate the Number and Date on the application form at the earmarked space.

Application without the prescribed fee would not be considered and summarily rejected.

No representation against such rejection would be entertained (d) Fee once paid shall not be refunded under any circumstances nor can the feel be held in reserve for any other examination or selection.

Note:- No fee is required to be paid by SC/ST/Women candidates of any community.

Age Limit-: Between 18 and 25 years.
(Relaxable for departmental candidates upto 40 years in the case of general candidates and up to 45 years in the case of candidates belonging to the Scheduled Castes and Scheduled Tribes in accordance with the instructions or orders issued by the Central Government from time to time).

Crucial Date-: The crucial date for determining the age limit shall be the closing date for receipt of applications from candidates in India (and not the closing date prescribed for those in Assam, Meghalaya, Arunachal Pradesh, Mizoram, Manipur, Nagaland, Tripura, Sikkim, Ladakh Division of Jammu and Kashmir State, Lahaul and Spiti District and Pangi Sub-Division of Chamba District of Himachal Pradesh, Andaman and Nicobar Islands or Lakshadweep).

In the case of post filled through Employment Exchanges the crucial date for determining the age limit shall be the closing date by which the employment exchange are asked to submit the names.

General Instruction-:

(i) Name of the post and category must be clearly superscripted /written on the top of the application.

(ii) Submission of false/incorrect/incomplete information and/or dubious/bogus document shall disqualify the candidate. In the event of any information being false/incorrect and/or any document being found dubious/bogus and/or ineligibility being detected at the point of time either before or after selection, candidature will stand automatically cancelled.

(iii) The candidate should fill up all the columns in the application and affix his/her recent passport size photograph (not more than three months old) signed partially on the photograph and partially on the application. The application should be duly signed by the candidate. The applications should be addressed to Director, National Sugar Institute, Kalyanpur, Kanpur (UP) 208017 by Registered post/ Speed post.

(iv) Copies of all documents regarding date of birth proof, educational qualification, mark sheets, caste certificate, domicile certificate, etc duly attested should be enclosed with the application.

(v) Person working in Central/State Govt. /PSU must apply through proper channel enclosing certificate from their establishment that NO DISIPLINARY ACTION IS CONTEMPLATED/PENDING against them and they have no objection in releasing them in case of selection. No Objection Certificate should be in ORIGINAL.

(vi) No TA/DA admissible to the candidate for appearing in the written test/skill Test.

(vii) Merit of candidates will be decided on the basis of total marks scored in the written examination only those who qualify the Skill/Trade Test shall be allowed to appear in the written examination.

(viii) Failure in the Skill Test/Trade Test shall be the failure in the examination.

BRIJESH KUMAR SAHU

(B.K. Sahu)
Senior Administrative Officer

APPLICATION FOR THE POST OF _____ category_____

(To be filled in capital only)

Affix your latest passport size Photograph duly signed by the Candidate

1. Full Name of the Applicant (In Block letters):_____
2. Father's /Husband's Name: _____
3. Date if Birth (in Christian era):_____

   (Attested copy of proof of age to be enclosed)

4. Marital Status : _____

   (If, married attested copy of marriage certificate ti be enclosed)

5. Nationality : _____

   (Attested copy of nationality certificate to be enclosed)

6. Religion : _____
7. Category to which belongs (SC/ST/OBC/EWS/GEN): _____

   (Attested copy of certificate to be enclosed)

8. Present Address : _____
9. Permanent Address : _____
10. Educational/Technical Qualification :

SL No	Name of Exam	Year of Passing	Univ. /Board	Div/Class/Grade	% of Marks

(Beginning with matriculation level) (Attach attested photocopies of certificates)

11. Weather already in Govt. employment (Yes/No) : _____

    (If yes, original No Objection Certificate to be enclosed)

12. Experience, if any: _____
13. Employment Exchange Registration Number (If any) : _____
14. Details of Fee if required :_____

I hereby declare that all the statements made in the application are true, correct and complete to the best of my knowledge and belief. In the event of any information being found false/incorrect and/or any document being found dubious/bogus and/or my ineligibility being detected at any point of time either before or after the test/interview, my candidate will stand automatically cancelled.

_____
Signature of the applicant
(Name of the applicant)

Dated: _____

Place: _____

1. Plan of Examination

S.No.	Post Name	Mode of Selection
1	Electrician	Part A: Written Test & Part B: Skill/Trade Test
2	Fitter 'C'	Part A: Written Test & Part B: Skill/Trade Test

1.1 The written test will comprise of 'Multiple choice questions (MCQs)' in a specified time duration.

1.2 The final selection will be based on the marks obtained in the 'Written Test'.

1.3 The Skill/Trade test shall be purely of qualifying nature and marks obtained in the Skill Test shall not be considered for final selection. It shall be mandatory to qualify the Skill/Trade test achieving the prescribed standard to be considered for final selection.

1.4 The standard of questions in the written test will be purely based on the knowledge level/curriculum in the respective vocational training course/engineering trade as prescribed in the essential qualifications.

2. Syllabus of Examination

The detailed syllabus for the proposed written test and Skill/Trade test is as follows:

2.1 Post Name: Electrician

A. Written Test Syllabus:

1. Fundamentals of electricity: Definitions, units & effects of electric current. Conductors and insulators. Conducting materials and their comparison.

2. Cables: Description, types, various joints and testing procedure, Cable insulation & voltage grades, Joints in electrical conductors, Techniques of soldering, Types of solders and flux.

3. Ohm's Law & Kirchhoff's Laws: Simple electrical circuits and problems, Series and parallel circuits, Wheatstone bridge principle and its applications.

4. Resistances: Laws of Resistance and various types of resistors. Resistors – colour code, types and characteristics. Effect of variation of temperature on resistance. Different methods of measuring the values of resistance. Series and parallel combinations of resistors.

5. **Electrostatics:** Capacitor, Different types, functions, grouping and uses.

6. **Alternating current fundamentals:** frequency, Instantaneous value, R.M.S. value Average value, Peak factor, form factor, power factor and Impedance etc. Sine wave, phase and phase difference, Active and Reactive power, Single Phase and three-phase system, Problems on A.C. circuits.

7. **Three Phase Circuits:** Advantages of AC poly-phase system, Concept of three-phase Star and Delta connection, Line and phase voltage, current and power in a 3 phase circuits with balanced and unbalanced load, Phase sequence meter.

8. **Chemical effect of electric current:** Laws of electrolysis, Anodes and cathodes, Types of cells, advantages/disadvantages and their applications, Battery- Types of battery charging, Safety precautions, Inverter & UPS fundamentals, Principle and operation of solar cell & panels.

9. **Electrical wiring:** Types of domestic and industrial wirings. Study of wiring accessories e.g. switches, fuses, relays, MCB, ELCB, MCCB, Circuit breakers etc., Grading of cables and current ratings. Principle of laying out of domestic wiring, PVC conduit and casing, capping wiring system, Different types of wiring - Power, control, Communication and entertainment wiring. Wiring circuits planning, permissible load in sub circuit and main circuit.

10. **Domestic Wiring:** Working principles and circuits of common domestic equipment and appliances, Concept of Neutral and Earth, Importance of Earthing, Earth resistance and earth leakage circuit breaker.

11. **Illumination & Lighting:** Laws of Illuminations, Types of illumination system, Illumination factors, intensity of light, Type of lamps, advantages/ disadvantages and their applications, Calculations of lumens and efficiency.

12. **Electrical Measurements & Measuring Instruments:** Classification & applications of various electrical instruments, PMMC and Moving iron instruments. Measurement of various electrical parameters using different analog and digital instruments, Measurement of energy in three phase circuits, Errors and corrections in measurement, Extension of range and calibration of various measuring instruments.

13. **Transformers:** Working principle, construction and classification of transformer, Single phase and three phase transformers. Turn ratio and e.m.f. equation, Series and parallel operation of transformer, Voltage Regulation and efficiency, Auto Transformer and instrument transformers (CT & PT)

14. Method of connecting three single phase transformers for three phase operation. Types of Cooling, protective devices, bushings and termination etc., Materials used for winding and winding wires in small transformer.

15. **DC Generator:** General concept of rotating electrical machines, Principle of DC generator, Use of Armature, Field Coil, Polarity, Yoke, Cooling Fan, Commutator, slip ring and Brushes, Laminated core etc. E.M.F. equation, Types of DC generators, Parallel Operation of DC Generators. Load characteristics of DC generators, Application, losses & efficiency of DC Generators, Routine maintenance and repair.

16. **DC Motors:** Principle and types, Relation between applied voltage back e.m.f., armature voltage drop, speed and flux of DC motor, DC motor Starters, relation between torque, flux and armature current, Changing the direction of rotation, Characteristics, Losses & Efficiency of DC motors, Methods

of speed control of DC motors, Lap and wave winding and related terms, Routine maintenance and repair.

17. Three phase induction motors: Principle of operation, construction & its various types, Slip and Torque. Different types of starters for three phase induction motors & its necessity, basic contactor circuit, parts and their functions, Single phasing prevention, Losses & efficiency, Various methods of speed control, Braking system of motor, Maintenance and repair.

18. Single-phase AC motors: Working principle, different methods of starting, Domestic and industrial applications of different single phase AC motors, Characteristics, losses and efficiency, Troubleshooting of single-phase AC induction motors.

19. Alternator: Principle of alternator, e.m.f. equation, Relation between poles, speed and frequency. Types and construction. Efficiency, characteristics, regulation, phase sequence and parallel operation.

20. Synchronous motors: Working principle and operation, Power factor improvement.

21. Basic concept of Power electronics devices & Digital Electronics, IC voltage regulators, Diodes, Transistor, Rectifier circuit - half wave, full wave, bridge rectifiers and filters etc.

22. Various control elements: Isolators, pushbuttons, switches, indicators, MCB, fuses, relays, timers and limit switches etc., Study and understand Layout drawing of control cabinet, power and control circuits.

23. Wiring accessories: Race ways/ cable channel, DIN rail, terminal connectors, thimbles, lugs, ferrules, cable binding strap, buttons, cable ties, sleeves, grommets and clips etc., Testing of various control elements and circuits.

24. Circuit diagrams and layouts: Basic concept and reading of single line diagrams and electrical symbols, Block diagram and working of voltage stabilizer, battery charger, emergency light, inverter and UPS. Preventive and breakdown maintenance.

25. Safety and Prevention: Electrical safety- Causes for electric shock & protection, Fire safety- types of fire prevention & fire extinguishing techniques.

Note: The above syllabus is indicative and the questions in the written test may include similar other topics pertaining to the level and content of essential qualification.

B. Skill/Trade Test Syllabus:

1. Prepare profile with an appropriate accuracy as per drawing following safety precautions.

2. Prepare electrical wire joints; carry out soldering, crimping and measure insulation resistance of underground cable.

3. Verify characteristics of various electrical and magnetic circuits.

4. Install, test and maintenance of batteries and solar cell.

5. Estimate, Assemble, install and test wiring system.

6. Plan and prepare Earthing installation.

7. Plan and execute electrical illumination/lighting system and test.

8. Select and perform measurements using analog / digital instruments and install/ diagnose smart meters.

9. Perform testing, error verification, calibration and repairing of electrical instruments.

10. Plan and carry out installation, fault detection and repairing of industrial and domestic appliances.

11. Execute testing, evaluate performance and maintenance of transformer.

12. Read and apply engineering drawing for different application in the field of work.

13. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.

14. Plan, execute commissioning and evaluate performance of DC machines.

15. Execute testing, and maintenance of DC machines and motor starters.

16. Plan, execute commissioning and evaluate performance of AC motors.

17. Execute testing, and maintenance of AC motors and starters.

18. Plan, execute testing, evaluate performance and carry out maintenance of Alternator / MG set.

19. Execute parallel operation of alternators.

20. Distinguish, organize and perform different motor windings.

21. Assemble simple electronic circuits and test for functioning.

22. Assemble accessories and carry out wiring of control cabinets and equipment.

23. Perform speed control of AC and DC motors by using solid state devices.

24. Detect the faults and troubleshoot inverter, stabilizer, battery charger, emergency light and UPS etc.

25. Plan, assemble and install solar panel.

26. Erect overhead domestic service line, outline various power plant layout and explain smart distribution grid and its components.

27. Examine the faults and carry out repairing of circuit breakers.

28. Test, locate the fault and repair a domestic wiring installation.

29. Read and apply engineering drawing for different application in the field of work.

30. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.

Note: The candidates shall be tested practically for his professional knowledge & employability skills as per the requisite job role of the post in the Skill/Trade test.

2.2 Post Name: Fitter 'C'

A. Written Test Syllabus:

1. Linear measurement: its units, dividers, calipers, hermaphrodite, centre punch, dot punch, prick punch their description and uses of different types of hammers, marking off table, Measuring standards (English, Metric Units) & angular measurements.

2. Files- Types, specifications,description, materials, grades,cuts, file elements and its uses, Special files: types, description & uses.

3. Marking off and layout tools: dividers, scribing block, marking off table, try square, ordinary depth gauge, protractor, Cold chisels- materials, types, cutting angles, Surface plate and auxiliary marking equipment, 'V' block, angle plates, parallel block, marking media, marking blue,Prussian blue, red lead, chalk and their special application.

4. Physical and Mechanical properties of engineering metals: ductility, malleability, hardness, brittleness,toughness, tenacity and elasticity.

5. Machines used for metal cutting: Power Saw, Band saw, Circular saw, Hack saw etc.

6. Principle, Constructional features, Reading, Uses and Care of various instruments like Micrometer, Digital micrometer, Vernier Calipers & its types, Digital Vernier calipers, Vernier bevel protractor, Vernier height gauge, Vernier micrometer, screw thread micrometer, dial test indicator, comparators, digital dial test indicator, mechanical fasteners, bench vice, vice-clamps, slip gauge, sine bar etc.

7. Drilling processes: common types (bench type, pillar type, radial type), gang and multiple drilling machine, Determination of tap drill size.

8. Sheet metal workshop: sheet and sizes, commercial sizes and various types of metal sheets, coated sheets and their uses as per BIS specifications, Shearing machine.

9. Marking and measuring tools: wing compass, tin man's square tools, snips, Tinman's hammers and mallets, sheet metal tools, Trammel- description,parts and uses. Hand grooves- specifications and uses, Sheet and wire gauge, Stakes-bench types, parts, their uses. Various types of metal joints their selection and application, tolerance for various joints, their selection & application.

10. Soldering and Brazing: Types of solder and its composition, flux, heating media of soldering iron, method of soldering, soldering joints, hard solder, types and method of brazing.

11. **Rivets:** Various rivets shape and form of heads, head size. Rivets-Tinman's rivets types, sizes, and selection for various works. Riveting tools, dolly snaps description and use, method of riveting, spacing of rivets. Flash riveting, use of correct tools, hot and cold riveting.

12. **Welding:** Safety equipments & precautions in welding shop, gas and electric welding (Before, during, after), Welding machines and accessories like welding transformer and generator, Welding hand tools:Hammers, Carbon dioxide welding, H.P. welding & L.P. welding : description, principle, and method of operation, Gases and gas cylinder : description, kinds, main difference and uses, ARC welding machines, welding electrodes, Oxygen acetylene cutting-machine, cutting torch, Types of Joints- Butt and fillet as per BIS specifications.

13. **Drill-** material, types, (Taper shank, straight shank), parts and sizes. Drill angle-cutting angle for different materials, cutting speed, feed, R.P.M. fordifferent materials. Drill holding devices- material, construction and their uses. Drill troubles: causes and remedy, Equality of lips, correct clearance, dead centre and length of lips. Drill kinds: Fraction, metric, letters and numbers, grinding of drill.

14. **Reamer-**material, types (Hand and machine reamer), kinds, partsand their uses, determining hole size (or reaming), Reaming procedure. Counter sink, counter bore and spot facing-tools and nomenclature.

15. **Screw threads:** terminology, parts, types and their uses. Screw pitch gauge: material parts and uses. Taps British standard (B.S.W., B.S.F., B.A. and 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 stud extractor).

16. **Grinding wheel:** Abrasive, grade structures, bond, specification, use, mounting and dressing, Selection of grinding wheels, Bench grinder: parts and use. Dies: British standard, metric and BIS standard, material, parts, types, Method of using dies. Die stock: material, parts and uses.

17. **Limits, fits and tolerances:** definition, types, description & terminology like basic size, actual size, deviation, high and low limit, zero line, tolerance zone, different standard systems, BIS system, method of expressing tolerance as per BIS Fits. Radius/fillet gauge, hole gauge, feeler gauge, limit gauge, ring gauge, snap gauge, plug gauge, screw gauge, pitch gauge, 'GO' system of gauges and their uses.

18. **Properties, Types and Uses:** Pig Iron, Cast iron, Wrought iron, Steels- Plain carbon steels, Non-ferrous metals like copper, aluminum, tin, lead, zinc, brass, bronze, gunmetal etc.

19. **Simple scraper-** flat, half round, triangular and hook scraper and their uses, Blue matching of scraped surfaces (flat and curved bearing surfaces), Testing of scraped surfaces.

20. **Lathe:** Specifications and constructional features, Description of main parts, holding of jobs on lathe, Lathe cutting tools- Single & multi point cutting tools, tool selection, HSS & carbide tools, use of coolants and lubricants, chucks & method of chucking of 3 jaw and 4 jaw chucks, Drilling and boring tools and its types, Grinding, Turning, Knurling & Taper- Description & calculations, Power tools: its constructional features, uses & maintenance, Jigs & Fixtures.

21. **Screw thread:** Definition– Uses and application, non-standard-screw threads, Principle of cutting screw thread in centre lathe, centre gauge and screw pitch gauge, setting tool for cutting internal and

external threads. Screws: material, designation, specifications, Tools for tightening/ loosening of screw or bolts, Torque wrench, screw joint calculation uses.

22. Maintenance: Types of maintenance, Maintenance schedule, machine manuals, Preventive maintenance - objective and functions of Preventive maintenance, Visual inspection, symbols and color coding, Assembly failures and remedies. Installation, maintenance and overhaul of machinery and engineering equipments.

23. Assembling techniques: aligning, bending, fixing, mechanical jointing, threaded jointing, sealing and torqueing, Dowel pins: material, construction, types, accuracy and uses.

24. Locking device: Nuts, Keys, Tapers- their types, description and uses.

25. Surface Finish: Importance & testing of dimensional tolerances for surface finish, Lapping and Honing- Materials & Applications, tools and abrasives for lapping & honing.

26. Heat treatment Processes: Normalizing, annealing, hardening, tempering, case hardening & carburising, Chromium silver plating, nickel plating and galvanizing.

27. Bearings: Description & classification, Ball bearings, roller bearings & needle bearings- Types, description and applications, bearing metals- types, composition and uses, various synthetic materials for bearing.

28. Pipes and pipe fitting: Pipe schedule and standard sizes, Pipe bending methods, bending fixture, pipe threads- Std. Pipe threads, Die and Tap, Pipe vices, Piping tools- pipe cutters, pipe wrenches, pipe dies, Fitting, erection and repairs of pipes in drainage & households.

29. Power transmissions: Belts, couplings & pulleys, their types, specifications and applications, V-Belts, Creep and slipping of belts, Type of belt drives, Hooks coupling, flange coupling, universal coupling etc.

30. Gears: Type of gears & their uses, terminology related to gears, repair of gear teeth, method of fixing geared wheel in relation to required drive, pinion and rack, worm gearing, velocity ratio of worm gearing. Care and maintenance.

31. Fluid power: Boyle's law, industrial hydraulic system, Pascal's Law, Compressed air generation and conditioning, Air compressors, Pressure regulation, Dryers, Air receiver, Conductors and fittings, FRL unit, Applications of pneumatics, Hazards & safety precautions in pneumatic systems, Pneumatic actuators: Types, Basic operation, Force, Strokelength, Single-acting and double-acting cylinders.

32. Pneumatic valves: Classification, Symbols of pneumatic components, 3/2- way valves (NO & NC types) (manually-actuated & pneumatically-actuated) & 5/2-way valves, Roller valve, Shuttle valve, Two- pressure valve, Electro-pneumatics: Introduction, 3/2-way single solenoid valve, 5/2-way single solenoid valve, 5/2-waydouble solenoid valve, Control components -Pushbuttons (NO & NC type) and Electromagnetic relay unit, Logic controls.

33. Pumps: Classification – Gear/vane/ piston types, Pressure relief valves – Direct acting and pilot-operated types, Pipes, tubing, Hoses and fittings – Constructional details, Minimum bend radius,

routing tips for hoses.

34. Hydraulic devices: Hydraulic cylinders, Hydraulic motors & Hydraulic valves, Types and Classification, DirectionalControl valves, Check valves, Flow control valves: Types & Speed control methods – meter-in and meter-out, Preventive maintenance & troubleshooting of pneumatic & hydraulic systems, cavitation and hydraulic oils, symbols of hydraulic components, hydraulic filters, hydraulic reservoir and accessories.

35. Technical terms used in industry: (in simple definition only) Technical forms, process charts, activity logs, various formats of industry, material estimation, inspection and quality control, cycle time, productivity reports, job cards, use of handbooks & reference tables.

36. Lubrication: Purpose, Types & uses of lubricants and Methods of lubrication-gravity feed, force (pressure) feed, splash lubrication. Cutting lubricants and coolants: Soluble off soaps, suds- paraffin, soda water, commonlubricating oils and their commercial names, selection of lubricants, properties of lubricants, viscosity of lubricant.

37. Clutch: Type, positive clutch (straight tooth type, angular tooth type), Chains, wire ropes for power transmission-types and brief description, washers and washer sizes.

38. Foundation bolt: types (Lewis cotter bolt) description of each erection tools, pulley block, crowbar, spirit level, Plumb bob, wire rope, manila rope, wooden block, The use of lifting appliances, extractor presses and their use, Practical method of obtaining mechanicaladvantage, the slings and handling of heavy machinery, special precautions in the removal and replacement of heavy parts.

Note: The above syllabus is indicative and the questions in the written test may include similar other topics pertaining to the level and content of essential qualification.

B. Skill/Trade Test Syllabus:

1. Plan and organize the work to make job as per specification applying different types of basic fitting operation and Check for dimensional accuracy following safety precautions. [Basic fitting operation – Marking, Hacksawing, Chiselling, Filing, Drilling, Taping and Grinding etc. Accuracy: ± 0.25mm]

2. Manufacture simple sheet metal items as per drawing and join them by soldering, brazing and riveting.

3. Join metal components by riveting observing standard procedure.

4. Join metal component by arc welding observing standard procedure.

5. Cut and join metal component by gas (oxyacetylene)

6. Produce components by different operations and check accuracy using appropriate measuring instruments. [Different Operations - Drilling, Reaming, Taping, Dieing; Appropriate Measuring Instrument – Vernier, Screw Gauge, Micrometer]

7. Make different fit of components for assembling as per required tolerance observing principle of interchange ability and check for functionality. [Different Fit – Sliding, Angular, Step fit, 'T' fit, Square fit and Profile fit; Required tolerance: ±0.04 mm, angular tolerance: 30 min.]

8. Produce components involving different operations on lathe observing standard procedure and check for accuracy. [Different Operations – facing, plain turning, step turning, parting, chamfering, shoulder turn, grooving, knurling, boring, taper turning, threading (external 'V' only)]

9. Plan & perform simple repair, overhauling of different machines and check for functionality. [Different Machines – Drill Machine, Power Saw, Bench Grinder and Lathe]

10. Make & assemble components of different mating surfaces as per required tolerance by different surface finishing operations using different fastening components, tools and check functionality. [Different Mating Surfaces – Dovetail fitting, Radius fitting, Combined fitting; Different surface finishing operations – Scraping, Lapping and Honing; Different fastening components – Dowel pins, screws, bolts, keys and cotters; Different fastening tools-hand operated & power tools, Required tolerance: ±0.02mm, angular tolerance ± 10 min.

11. Make different gauges by using standard tools & equipment and checks for specified accuracy. [Different Gauges – Snap gauge, Gap gauge; Specified Accuracy - ±0.02mm]

12. Apply a range of skills to execute pipe joints, dismantle and assemble valves & fittingswith pipes and test for leakages. [Range of skills – Cutting, Threading, Flaring, Bendingand Joining]

13. Make drill jig & produce components on drill machine by using jigs and check for correctness.

14. Plan, dismantle, repair and assemble different damaged mechanical components used for power transmission & check functionality. [Different Damage Mechanical Components – Pulley, Gear, Keys, Jibs and Shafts.]

15. Identify, dismantle, replace and assemble different pneumatics and hydraulics components. [Different components – Compressor, Pressure Gauge, Filter Regulator Lubricator, Valves and Actuators.]

16. Construct circuit of pneumatics and hydraulics observing standard operating procedure & safety aspect.

17. Plan & perform basic day to day preventive maintenance, repairing and check functionality.

18. Plan, erect simple machine and test machine tool accuracy. [Simple Machines – Drill Machine, Power Saw and Lathe]

Note: The candidates shall be tested practically for his professional knowledge & employability skills as per the requisite job role of the post in the Skill/Trade test.