

Switchboard Operator
Electric Lineman
Welder

Heng a chung a Technical Post hrang hrang atan hian Mizoram Sorkar Guidelines the Mizoram Direct Recruitment (Conduct of Examination) Guidelines, 2018 (as Amended) in Common Syllabus for Group 'C' a siam ang chu zawm a ni ang.

COMMON SYLLABUS FOR DIRECT RECRUITMENT TO GROUP 'C' POSTS
[The syllabus mentioned below shall be followed unless anything contrary is provided in the Recruitment Rules/Service Rules/Examination Regulations for the relevant service/post(s)]

Paper	Subject	Marks	Duration
Paper-I	General Knowledge(50 questions)	100	3 hours with additional time of 40 minutes for Visually handicapped/ Cerebral palsy candidates
	General English (25 questions)	50	
	Essay writing	30	
	English Comprehension	20	
	Total	200	
Paper-II	Simple Arithmetic (50 questions)	100	3 hours with additional time of 40 minutes for Visually handicapped/ Cerebral palsy candidates
	Basic Computer Knowledge (50 questions)	100	
	Total	200	
Paper-III (Only for technical/ specialised posts and such other posts wherein the Recruitment Rules/ Service Rules prescribed technical/special qualifications which merits conduct of examination in the knowledge of concerned technical/specialised subject)	Technical/Specialised subject (100 questions)	200	3 hours with additional time of 40 minutes for Visually handicapped/ Cerebral palsy candidates
Total		200	

A chung a Syllabus tarlan ang hian Written Exam ah hian Paper-I, Paper-II leh Paper-III (Technical Subject) te a awm anga, Paper-III (Technical Subject) Syllabus bik hi a hnuaiah hian a hranpa a tarlan a ni a, Paper tin hi Mark 200 niin , Full Mark hi 600 a ni ang.

APPENDIX-IV

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	Total	200	

Notes:

- 1) Questions shall be set in Objective Type Multiple Choice pattern only except for essay writing and English comprehension under Paper-I with all questions carrying equal marks and answers for each of the questions shall be marked using blue or black ball point pen. In other words, there shall be multiple probable answers (at least four) wherein the candidate has to choose the correct answer for every objective type question.
- 2) Questions will be set in tune with the level of educational qualifications prescribed in the corresponding Recruitment Rules/Service Rules for the post(s).
- 3) A brief description of the common syllabus for direct recruitment to Group 'C' posts is as follows:

Paper-I

General Knowledge: Questions will be designed to test the candidate's knowledge of current events and of such matters of everyday observation and experience as may be expected of an educated person. The test will also include questions relating to Indian history and culture, Indian polity including the Constitution of India, geography, economy and general science. Questions on Mizo history and culture will also form part of the syllabus.

General English: Questions will be designed to test the candidates understanding and knowledge of English language, vocabulary, spelling, grammar, sentence structure, synonyms, antonyms, sentence completion, phrases and idiomatic use of words etc. There will be questions on comprehension of a passage also.

Essay Writing: Question on essay writing will be designed to test the candidate's grasp of his material, its relevance to the subject chosen, and to his ability to think constructively and to present his ideas logically, constructively and concisely.

English Comprehension: There will be questions on comprehension of passages also to test the vocabulary, grammar, logical thought ability and overall grasp of the candidates over English language.

Paper-II

Simple Arithmetic: Number system, simplification, roots, averages, discounts, percentages, profit & loss, ratio and proportion, partnership, chain rule, time & work, time & distance, simple & compound interest, mensuration, permutations & combinations, heights & distances, line graphs, bar graphs, pie charts and tabulation.

Basic Computer knowledge: Introduction to Computers, introduction to Graphical user interface based Operating System, elements of Word Processing, Spreadsheets, Power point presentations, Computer communication and internet, world wide web and web browser, communication and collaboration.

Paper-III

Questions relating to the concerned technical/specialised subject will be set as per the educational qualification prescribed in the relevant Recruitment Rules/Service Rules and the detailed syllabus for this Paper shall be notified by the concerned recruiting Department well in advance

Electric Lineman Syllabus : Full Mark 200

1. Occupational Safety & Health - (25 Marks)

Responsibilities of switchboard operators. Basic safety introduction - Danger, Warning, caution & personal safety messages, Basic injury prevention, Hazard identification and avoidance and PPEs, Electrical Shock and leakage of current, types of leakage of current. Basic injury prevention, Basic first aid.

Response to emergencies e.g. power failure, fire, and system failure. Use of Fire extinguishers. Concept of Standards and advantages of BIS/ISI. Introduction to 5S concept.

2. Tools for electrical work : (15 Marks)

Electrical tools – types and uses.

3. Fundamental of electricity: (75 Marks)

Fundamental terms- Current, Voltage definitions, AC, DC, Phase, Neutral, Earth. Signs and symbols of Electrical accessories. Ohm's Law - Simple electrical circuits and problems. Reading of simple Electrical Layout. Resistors -Law of Resistance. Series and parallel circuits. Simple electrical wiring & accessories Fluorescent tube light wiring. Alternating Current -Comparison and Advantages D.C and A.C. Single Phase and three-phase system etc. P.F & its improvement. Concept three-phase Star and Delta connection. Line and phase voltage, current and power in a 3 phase circuits with balanced and unbalanced load. Type of faults – open circuit, short circuit, earth fault and leakage. Testing of faults by instruments. Various ways of electrical power generation. Symbols used in electrical circuits.

Principle of laying out of domestic wiring. Voltage drop concept. 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. Estimation of load, cable size, bill of material and cost. Inspection and testing of wiring installations. Special wiring circuit e.g. godown, tunnel and workshop etc.

DC Machines, AC Motors, motor starter. Basic knowledge of soft starter.

4. Cables : (15 Marks)

Concept of Neutral and Earth. Introduction of National Electrical Code. Conductors, insulators and semi-conductors. Switches, fuses, relays, MCB, ELCB, MCCB & its application etc. Grading of cables and current ratings. Standard wire gauge (SWG). Specification of wires & Cables-insulation & voltage grades- Low , medium & high voltage. Testing of wires. Current carrying capacity of different conductors -Low, medium & high voltage. Insulation materials. Use of Crimping tool, wire stripper, different types of lugs. Cable Jointing, cable joining techniques, types of cable jointing kits and its specifications.

Need of cables, advantages and disadvantages, various types viz., PVC, XLPE, PILC, oil filled, etc. Cable insulation & voltage grades. Joints and terminations; Methods of conductor connection. Connectivity for cable screen and armour, mechanical protection Kits for joints and terminations. Cable termination to equipment.

5. Battery : (5 Marks)

Parts of battery. Practice on Battery Charging, Preparation of battery charging, Testing of cells, Charging of batteries by different methods. Routine care & maintenance of Batteries .

9. Protection & Switchgear : (5 marks)

Location of switchgear. Power plant auxiliaries and their protection. Type & use of Circuit breakers, Switches, Switch boards & control panel, regulating & protective relays, voltage, frequency & power factor control, earthing, lightning arresters, isolated earthed neutrals.

Magnetic contactors – installation, maintenance, Relays – troubleshooting

10. Earthing : (5 Marks)

Different methods of earthing. Measurement of Earth resistance by earth tester. Importance of Earthing. Plate earthing and pipe earthing methods and IEE regulations. Earth resistance and earth leakage circuit breaker.

11. Sub – Station : (10 Marks)

Sub-station equipment, Layout and auxiliaries, typical control scheme for circuit breakers, isolators, bus bar arrangements, bus zone protection, load shedding and equipments.

Types of Transformers (Power & Distribution Transformer). Construction/maintenance of transformer, Single phase and Poly phase. Auto Transformer(Variac), classification C.T. & P.T. Instrument . Transformers connecting with meter, relays & Protective devices. Transformer oil testing. Transformation ratio, Testing of single phase and Three Phase Transformers - Cleaning, maintenance, testing and changing of oil. Location & mounting. Use of Current Transformer (C.T.) and Potential Transformer (P.T.). Material for windings. Bushing and termination. Silica Gel.

12. Testing & Measuring Instruments : (20 Marks)

Measurement of various electrical parameters using different analog and digital instruments viz., multi-meter, Wattmeter, Energy meter, Phase sequence meter, Frequency meter, Multimeter, megger, parallel test lamp, series test lamp etc. Measurement of energy in three phase circuit. Important common applicable IE rules. Different methods of measuring the values of resistance. Errors and corrections in measurement. Loading effect of voltmeter and voltage drop effect of ammeter in circuits.

Detection and location of earth other faults in electrical apparatus and cables, low voltage and remote control circuits. Insulation and continuity tests, rectification of faults, tests for insulation resistance to earth, testing of leakage protective device, Earth testing and its continuity.

13. Transmission & Distribution : (30 Marks)

Methods of voltage control and power factor correction, current limiting reactors, Knowledge of protective devices, over current under voltage, reverse power. Layout plan and single line diagram of transmission. Test /Check different type of protection relay. Construction/maintenance of overhead lines. Main components of overhead lines- Types of power line Low voltage line medium Voltage line & high voltage line Voltage standard (LV, HV, EHV). Conductor materials, line supports, Insulators, Types of Insulators i.e pin, disc,suspension Strain etc. Use of cross Arm. Pulley blocks and Lifting tackles, Uses of Ladders, Draw vice.

Conductor materials – types of supports-types of insulators- Selection of conductors- wood,rcc, steel poles-height, clearances-sagging-guys-earthing of overhead lines- accessories for aluminium conductors-stay wire assembly. Erecting of poles. Use of Stay Rod, brackets. Wire Jointing. Different types of cable joints. Conductor Arrangement, Ground clearance, Wire crossing clearance, sag table. Scraping and Painting of pole and Tower.

Use of Earth plates for low & H.T. overhead lines and transformer. Use of Lightning Arrestors

Reference :

Electrician/Wireman/Switchboard Attendant Trade ITI

Switchboard Operator Syllabus : Full Mark 200

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Electrician/Wireman/Switchboard Attendant Trade ITI

Welder Syllabus : Full Mark 200

1. Operational Safety and Health : (Mark 20)

Importance of welder discipline . Elementary First Aid.
Importance of Welding in Industry -Safety precautions in Shielded Metal Arc Welding, and Oxy-Acetylene Welding and Cutting. Fire extinguisher. Protective clothing.

2. Metal Jointing Process : (Mark 20)

Different process of metal joining methods: Bolting, riveting, soldering, brazing, seaming etc. Types of welding joints and its applications. Edge preparation and fit up for different thickness. Surface Cleaning. Welding vs riveting.

Introduction and definition of welding. Arc and Gas Welding Equipments, tools and accessories. Various Welding Processes and its applications. Arc and Gas Welding terms and definitions.

3. Shielded Metal Arc Welding (SMAW) : (Mark 40)

Equipments. Basic electricity applicable to arc welding and related electrical terms & definitions.

Heat and temperature and its terms related to welding. Principle of arc welding. And characteristics of arc.

Arc welding power sources: Transformer, Rectifier and Inverter type welding machines and its care & maintenance. Advantages and disadvantages of A.C. and D.C. welding machines.

Welding positions as per EN & ASME: flat, horizontal, vertical and over head position. Weld slope and rotation. Welding symbols as per BIS & AWS.

Arc length – types – effects of arc length. Polarity: Types and applications.

Arc blow – causes and methods of controlling. Distortion in arc & gas welding and methods employed to minimize distortion. Arc Welding defects, causes and Remedies. Weld quality inspection, common welding mistakes and appearance of good and defective welds. Weld gauges & its uses.

4. Oxy-Acetylene Cutting & Welding (OAW/OAGC) : (Mark 30)

Common gases used for welding & cutting, flame temperatures and uses. Types of oxy-acetylene flames and uses. Oxy-Acetylene Cutting Equipment principle, parameters and application.

Calcium carbide uses and hazard. Acetylene gas properties and flash back arrestor. Oxygen gas and its properties, uses in welding. Charging process of oxygen

and acetylene gases Oxygen and Dissolved Acetylene gas cylinders and Color coding for different gas cylinders. Uses of single and double stage Gas regulators. Oxy acetylene gas welding Systems (Low pressure and High pressure). Difference between gas welding blow pipe(LP &HP) and gas cutting blow pipe Gas welding techniques. Rightward and Leftward techniques. Gas welding filler rods, specifications and sizes. Gas welding fluxes – types and functions. Gas welding defects, causes and remedies

5. Pipe Welding : (Mark 30)

Specification of pipes, various types of pipe joints, pipe welding all positions, and procedure. Difference between pipe welding and plate welding. Pipe development for Elbow joint, “T” joint, Y joint and branch joint. Brief use of Manifold system

6. Electrodes : (Mark 30)

Electrode : types, functions of flux, coating factor, sizes specifications of electrode. Effects of moisture pick up. Storage and baking of electrodes. Tungsten electrodes –types & uses, sizes and preparation

Weldability of metals, importance of pre heating, post heating and maintenance of inter pass temperature. Welding of low, medium and high carbon steel and alloy steels. Stainless steel types- weld decay and weldability. Cast iron and its properties types. Welding methods of cast iron.

7. Gas Metal Arc Welding : (GMAW) (Mark 10)

Metal Arc Welding and Gas Tungsten Arc welding. Introduction to GMAW -equipment – accessories. Various other names of the process. (MIG/MAG/CO2 welding.) Advantages of GMAW welding over SMAW , limitations and applications. Process variables of GMAW. Name of shielding gases used in GMAW and its applications. Edge preparation of various thicknesses of metals for GMAW. GMAW defects, causes and remedies. Heat input and techniques of controlling heat input during welding. Heat distribution and effect of faster cooling.

8. Inspection & Testing : (Mark 20)

Types of Inspection methods-before,during and after welding. Classification of destructive and NDT methods. Welding economics. Common Mistakes. Safety precautions in Gas Welding.

Reference :

Welder Trade ITI