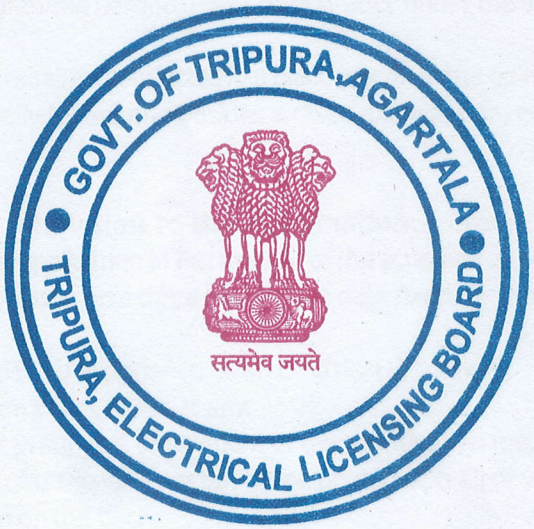
GOVT OF TRIPURA

TRIPURA ELECTRICAL LICENSING BOARD
AGARTALA



Syllabus of examination for certificate of Competency of supervising Workman and to operative Electrical Workman

BROCHURE
(COURSE MATERIALS)

--CHAPTER – II

EXAMINATION

11. Examination under **clause 6(b)** shall be conducted by the Board at such places and on such dates as may be notified by the Secretary from time to time in the Tripura Gazette and **local newspapers.**

12. Every such examination shall be such a nature as to test the practical knowledge, experience and competency of the candidate in the works specified in **Rule-29** of the Central Electricity Authority **(Measures Relating To Safety And Electric Supply) Regulations, 2010** to the satisfaction of the board for the purpose of granting certificates of competency under the said Rule.

13. Every examination shall be conducted in a place where, in the opinion of the Board, the candidate's knowledge can be practically tested and besides written examination, each candidate shall be tested in viva-voce.

14. Application for admission to the examination:- Every candidate seeking admission to examination shall make an application in **Form – 'A'** of the schedule annexed hereto, duly filled in, to the Secretary not less than **twenty one days** before the date fixed for the examination together with:-

(a) Testimonial of practical experience as an Electrical Workman.
(b) Electrical Workman's Certificate, if any.
(c) Challan or receipt in support of payment of the examination fee, and
(d) **3(three)** copies of a recent **Passport size** photograph all of which shall bear his signature or thumb impression on the back.
(e) Educational qualification/ Technical qualification, if any and
(f) Certificate for the **date of birth / age** on the date of application and
(g) Voter ID/AADHAR Card/PRTC in support of residential address.

15. The fees paid by a candidate, whose application for admission to an examination has been accepted shall not be refunded to him on any account. Provided that the Board may, subject to the other provisions of these regulations, allow a candidate who has earlier been prevented from appearing in the examination to appear in the next examination without further payment of fees. In the event of a candidate not appearing at the next examination, his application will be lapsed and the fees will be forfeited.

CHAPTER – III

Certificate of Competency for Operative Electrical Workman.

16. (i) The examination for Certificate to Electrical Workman which is intended for Operative Electrical Workman shall be distinct and separate from that of Supervising Electrical Workman.

(ii)**Eligibility:-**

The Examination of Operative Electrical Workman will consist of a compulsory paper carrying **100** marks for **(three) hours** written examination and candidates must secure minimum **40 marks** in the compulsory paper to qualify for appearing in subsequent Practical Examination and Oral tests. There will be separate practical examination and oral tests for **02(two)** hours carrying **50 marks** for each of the classes and candidate must secure minimum **25 marks** to pass in a particular class.

Candidates who have cleared compulsory paper will be allowed to appear in 3 (three) consecutive practical examinations and Oral tests. In the event of failure their cases will be considered as fresh cases requiring passing of compulsory written paper afresh.

Candidates for appearing in the examination for certificate of Competency to Operative Electrical Workman shall be persons having minimum educational qualification of **class – VIII (passed)** and

(a) Who have been trained for at least **2 (two)** years under an electrical contractor licensed under the State Government or

(b) Who have received other electrical training as an Workman which is considered satisfactory by the Board. Provided that a candidate for Operative Workman's Certificate in the class or classes relating to high pressure electrical installations must have valid Operative Workman's Certificate in the corresponding class or classes pertaining to medium pressure electrical installation work.

(c) Who have got **10 (ten)** years practical experience to be certified by a person having at least valid Supervisory certificate and **30 (thirty)** years of age or more are exempted from written examination and practical test(s) and eligible to appear before the Interview Board who will decide their eligibility for granting the certificate.

(d) Who have passed **2(two)** years course in Electrical trade and / or Wiremen trade from recognized Institution like I.T.I. etc. are exempted from written examination and practical Test(s) for Operative Electrical Workman and eligible to appear before the interview Board who will decide their eligibility for granting the Certificate.

(e) The criterion for minimum educational qualification may be waived for the persons who have attained the age of **45 years** or above on the date of application and have at least **10(ten)** years practical experience in the trade to be certified by person having a valid Supervisory Certificate. Such candidates are exempted from written examinations and practical tests and are eligible to appear before the Interview Board who will decide their eligibility for getting the certificate.

17. (i) Syllabus :-

Syllabus for examination for Certificate of Competency to Operative Electrical Workman shall cover any or all of the following subjects and the certificate will contain a reference to one or more classes of wiring referred to in **Sub-Clause (ii)** below:-

a) Ascertaining the size of wires of solid and stranded conductors,
b) Use of test lamps.
c) Use of bell battery and other apparatus for sorting out circuits
d) Method of testing polarity and phasing out circuits,
e) Connections and diagrams for distribution boards,
f) Wiring of fittings, fixtures and other consuming appliances,
g) Methods of erecting service lines, bare and covered with insulated materials,
h) The installation of electric bells and indicators operated from electric supply lines,
i) **Jointing and soldering:**
   a) making straight and tee joints in solid and stranded conductors and soldering them,
   b) making Britannia and other approved joints in bare aerial line and soldering them.
j) Soldering lugs and sockets on wires and cables and finishing off the insulting.
k) Testing faults, measuring insulation resistance, leakage current for internal wiring and measurement of insulation resistance for over-head lines, motors and transformers.
l) Measurement of earth resistance,
m) Action to be taken and methods of treatment in case of person suffering from electric shock.

(ii) Installation work of the classes and with the kinds of cables and wires set out below: Voltages not exceeding **"Medium Pressure"** Central Electricity Authority **(Measures Relating To Safety And Electric Supply) Regulations, 2010**

a) Wiring of Buildings (for lights, fans and small motors):-
   (i) Cleat, wood/plastic casing and capping system employing wires and cables other than paper insulated cables.
   (ii) PVC and conduit systems (also any other system as permitted under the **Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010** using wires and cables other than paper insulated cables.

b) Motor wiring (including generators in conduit with wires and cables other than paper insulated cables,
c) Cable connections by PVC cables with over-head lines,
d) Over-head lines only up to and including 33 KV
e) PVC/ PILC/ XLPE cable and jointing by conventional methods,
f) Over-head lines only,
   (i) Up to 33 KV
   (ii) 33 KV and above.
g) Over-head lines with paper insulated cable jointing:-
   (i) Up to 33KV
   (ii) Exceeding 33 KV
h) Paper insulated cable and jointing.

Note:- The syllabus may be added to or amended from time to time as may be considered necessary by the Board.

18. Grant of Certificate of Competency to Operative Electrical Workman:

Candidates who have passed examination for certificate of Competency to Operative Electrical Workman shall be recommended for a certificate which the State Government may grant in Form – C on receipt of prescribed fees. The Board may also recommend for granting such certificate to any person who has fulfilled the requirement of **clause-12** and satisfied the Board that his qualification and practical experience justify grant of Workman's Certificate without requiring him to sit for examination. Provided also that Workman Permit issued by other State Licensing Boards may be recognized on reciprocal basis, in cases where electrical contractors registered with other State Licensing Boards are engaged in the State, on submission of application in prescribed form with prescribed fee, it any.

Renewal of Certificate:

Operative Electrical Workman's Certificate granted under these regulations shall be for a period not exceeding **10(ten)** years provided prescribed fee for the fee for the certificate is deposited by the person concerned and such fee shall not be refunded on any account.

Such certificate shall be renewed every **10(ten)** years. The application for renewal, along with the original Certificate and treasury challan showing deposit of prescribed renewal fee, should be submitted to the Secretary at least **1(one)** month before the date of expiry. In case a person fails to renew his certificate before its date of expiry, he may, on payment of prescribed late fee, apply to the Secretary within **1(one)** year from the date of expiry and such application shall be accompanied by:

(i) **Original Certificate.**
(ii) **Treasury Challan** showing deposit of late fee in addition to prescribed renewal fee.

The Certificates which are not renewed as per provisions of this clause will automatically be lapsed and the person concerned will have to apply afresh for appearing in the written and oral tests or interview for grant of certificate.

CHAPTER – IV

Certificate of Competency to Supervising Workman.

19. Examination for Supervising Workman :-

The Examination for Certificate of Competency to Supervising Workman is intended for electrical Workman who will supervise installation work, specified in **clause 21(c).**

20. Eligibility:-

Candidates for examination for Certificate of Competency to Supervising Workman must comply with **clause-13** and must:

a) Possess valid certificate of Operative Electrical Workman and have at least **5(five)** years practical experience as Operative Electrical Workman which is regarded as satisfactory by the Board. The experience is to be certificate by a person having at least a valid Supervisory Certificate, or

b) have passed Madhyamik Pariksha or equivalent examination(s) from any Board or council and have at least **5 (five)** years practical experience to be certified by a person having at least a valid Supervisory Certificate.

Provided that the Board may, at their discretion, permit any person they think fit to sit for the examination for Certificate to Supervising Workman.

Provided also that for the purpose of this regulation every candidate who holds a Degree or Diploma in Electrical Engineering, from an Institution recognized by State/ Central Government, and has at least one year's practical experience are exempted from appearing for the written examination as well as practical and oral test for certificate of competency in **Parts I, II & X** and are to appear before Interview Board who will decide their eligibility for granting the Certificate.

Provided also that the candidates having **Degree / Diploma** in Electrical Engineering from an Institution recognized All India Council for Technical Education, with at least **one year** experience are required to appear in Oral and Practical test for **3(three)** hours a carrying **100 marks** for the Supervising Certificate in parts other **than I, II & X** . The candidate has to secure minimum **50 marks** to pass the examination.

Provided further that persons who have held the regular post of Sr. Manager (Electrical) / Assistant Engineer(Electrical) or above with at least **15(fifteen)** years' experience may be issued certificate of competency in the field of their experience covering the table under **clause 21(c)** without requiring them to appear in any examination / test.

a) Persons who have **15(fifteen)** years of practical experience to be certified by a person having at least a valid Supervisory Certificate and are of **40(forty)** years of age on the date of submission of application, are exempted from appearing in written examination as well as practical and oral tests. But they are to appear before an Interview Board who will decide their eligibility for granting the certificate.

21. Examination for Certificate of Competency to Supervising Workman:

Candidates for the Certificate of Competency shall be examined by a written paper for each part carrying **100 marks** and also by practical examination and oral tests of

50 marks. Candidates will normally be examined through the medium of English and Bengali languages. The Board may permit a candidate to be examined through other medium of languages as may be possible for the Board to arrange. The Candidate has to secure minimum **40 marks** in written paper(s) and **25 marks** in Practical examination and oral test with aggregate of **65 marks**. When a candidate fails in practical examination and oral tests only, he will be allowed to appear in 3(three) consecutive practical examination and oral tests failing which his case will be considered as fresh candidate and he will have to appear in both written and practical examinations and oral test for getting the certificate.

b) for the purpose of these clause, all electrical installation works shall be divided as shown under **sub-clause – 'C'** of this clause. Successful candidate shall be recommended for a certificate of competency for any class / classes of the installation works as the Board decides about their competency to Supervise.

c) The syllabus for each class of certificate mentioned in column **(1)** shall consist of parts in column **(2)** of the table below:- (Candidate may appear for the examination for any class of certificate).

Table		
Certificate for		**Parts of syllabus**
1.(a)	Wiring for system not exceeding 650 V	**I & II.**
(b)	D.C. Apparatus not exceeding 650 V	**I, II & III**
(c)	A.C. Apparatus not exceeding 650 V	**I, II & IV.**
(d)	Installation exceeding 650 V	**I, II, III, IV & V.**

Note: - Part-I is compulsory for all the candidates. The passing of the parts are cumulative and progressive. The candidate must pass in all the parts in sequence shown.

Certificate for		**Parts Compulsory**
2. (a)	Aerial line exceeding 250 V	**I & VI.**
(b)	Underground Cables	**I & VII**
(C)	Lifts	**I, II, III, IV & VIII.**
(d)	Electric signs	**I, II, III, IV & IX.**
(e)	Wiring for system not exceeding 250 V	**I & X.**
(f)	Transformer installation exceeding 650 V	**I, II & XI.**
(g)	Mining Installations	**I, II, IV, VI(A), VII(A) & XII.**

Note:- Certificate endorsed for underground cable works an aerial lines exceeding **250 V** will be divided into section **A. B. C** which are progressive and cumulative. Certificate granted to successful candidates will be endorsed to denote the section or sections in which the candidate has qualified.

A Candidate qualifying in **Part-V** need not qualify further in **Part-XI.**

Explanation: Part XI is included in the syllabus in Part-V.

General Notes:-The Board reserves the right to amend, alter or add to the under mentioned syllabus at any time and without any notice.

PART - I

ELEMENTARY PRINCIPLES

Electrical Properties of materials:-

General idea about safety, types of fire extinguisher and use, safety sign, knowledge of tools, types of wires, joints and use, solders, flux, soldering, brazing and their uses. Conductors, Semiconductors and Insulators and their relative merits. The effect of commonly occurring conditions such as moistures, heat etc. conditions of materials:- Magnetization by electric currents, electromagnets and their application. Conductors, bare and insulated. The resistance and safe current carrying capacity, calculation of sizes of conductors for connected load with due regard to heating and voltage drop, Electrical parameters & Electrical symbols.

Basic concept of Illumination, Solid angle, Luminous Flux, Lumen, Luminous Intensity, Candela, Candle Power, Illuminance, Lux or Metre-candle, Brightness or Luminance, Luminous Efficiency, Laws of Illumination.

Purpose of Electrical control gear, switch, fuse, miniature circuit breaker, residual current circuit breaker, earth leakage circuit breaker, moulded case circuit breaker, isolator. Ranges of Low, Medium, High and Extra High Voltage.

Electrical circuit, Power: Active & Reactive, Power factor and its method of improvement. Series/Parallel connections, Ohms law, Specific resistance, Laws of resistance, Insulation resistance. Application of Ohm's law to simple methods of ascertaining resistance, voltage and current. Kirchoff's law, Lenz's law and Faradays law of electromagnetic induction and their applications. Skin effect

Electrical measurements and measuring instruments such as Ammeter, Voltmeter, Wattmeter, Energy Meter, Insulation Tester , Earth Tester, Current Transformer, Power Transformer. Electric shock:- different method of electric shock, precaution for electric shock, Action to be taken, method and duration of treatment in cases, of persons suffering from electric shock, Concepts of power and lighting circuit diagram in domestic, industrial & commercial buildings.

Purpose of Earthing: Types of Earth electrodes, Earth lead & earth continuity conductor, leakage to Earth & Protective devices

Grades and classes of cables :-

Their suitability of different kinds of installation works. The installation and systematic testing of cables for continuity, leakage, insulation resistance and the testing of connections.

A general knowledge of **C.E.A. (Measures Relating To Safety and Electric Supply) Regulations, 2010** as applicable to installation work of this part.

PART – II

WIRING FOR SYSTEMS UPTO 650 VOLTS.

Estimation of total load of a system and rating of Main Switch. Distribution through Sub-mains, Distribution Boards and Sub-circuits.

Voltage drop in a distribution system of a Medium Voltage installation and its limits. Balancing of loads, Limit of load in a single circuit.

Types and size of board, casing, capping, PVC pipes, GI pipes, gutkha and screw, their uses. Types of wiring and their uses.

Types and sizes of conductors, Standard wire gauges, effective cross-section. Solid conductor & Stranded conductor. Advantages of stranded conductor.

Current rating of wires and conductors and danger of using undersize conductor and oversize fuses. Earthing Practices, Statutory provisions of earthing, Types & Sizes of Earth connections.

Service Connection, Service line, Service connection at low voltage, Preparation of Estimate, Single Phase service connection estimate.

Connection of low pressure installation to medium pressure supply mains. Wiring installation including connections for power and other purposes but excluding that installation work specifically covered by **parts III & IV.**

A working knowledge of the **C.E.A (Measures Relating To Safety and Electric Supply) Regulations, 2010** as applicable to installation work of this part.

PART – III

DIRECT CURRENT (D.C.) APPARATUS UPTO 650 V.

Generators upto 650 volts:-

General concept of DC electrical machines, Principle of DC generator, use of armature, field coil, polarity, yoke, commutator, slip ring, brushes, laminated core, EMF equation of DC generator, armature reaction

D.C. series, shunt and compound wound types. Elementary theory, installation, operation and maintenance. Parallel running of machines and balancing of loads. Interpoles, Commutators and their maintenance. Carbon brushes, their adjustment and care, Methods of voltage regulation.

Motors upto 650 volts :-

D.C. series, shunt and compound wound types. Elementary theory, installation, operation and maintenance. Various methods of speed control and reversal of direction.

Cells and batteries :-

Primary Cells, Dry Cells, storage or secondary batteries or accumulators and their installations. Lead acid cell/battery (container, plates, separators, cover, electrolyte). Chemical reaction, Ratings, charging of batteries, Float, Boost & Trickle charging, Initial and subsequent charging of batteries, Checking of charged battery, Sulphation, Internal short circuiting, Charging circuits and their calculations, Series and parallel circuits. Installation and maintenance of Battery & battery charger. Use of Hydrometers.

Generator, Motor :-

Types of Enclosures, Earthing

Control Gear:-

The various types of switches, fuses, starters, controllers, regulators their uses and installation. Installations in general including portable appliances but excluding that installation work specifically covered by **Parts: IV, V & VI.**

A working knowledge of the **C.E.A (Measures Relating To Safety And Electric Supply) Regulations, 2010** as applicable to installation works of this part.

PART – IV

ALTERNATING CURRENT (A.C.) APPARATUS UPTO 650 V.

Generators upto 650 volts:-

Alternating (A.C.) single and three phase, Elementary theory, installation, operation and maintenance. Parallel running of machines, rotary converters, power factor meter, frequency meters and synchroscopes. Methods of

voltage and frequency control conditions and methods for synchronizing. Control Panels and synchronizing panels.

Motors upto 650 volts :-
Alternating (A.C.) single and three phase, Induction & Synchronous Machines. Elementary theory, installation, operation and maintenance. Various methods of speed control and reversal of direction. Application of variable speed drive.
Earthing Practices, Statutory provisions of earthing, Types & Sizes of Earth connections.

Generator, Motor :-
Types of Enclosures, Earthing, Generator Neutral Earthing

Control Gear:-
The various types of switches, fuses, starters, controllers, regulators their uses and installation. Installation in general including portable appliances but exceeding that installation work specifically covered by **Parts – V & VI.**

A working knowledge of the **C.E.A (Measures Relating To Safety And Electric Supply) Regulations, 2010** as applicable to installation works of this part.

PART – V

INSTALLATIONS EXCEEDING 650 VOLTS.

Generators & Motors above :-
Elementary theory, Installation, operation & maintenance 650 volts including H.V. Protective devices

Transformers above :-
Types of transformers and their uses. EMF equation transformer, process of transformer, testing of transformer, protective device of transformer

Types, Methods of cooling, Vector Groups, Parallel operation, 650 volts (including High Voltage Installation (indoor & outdoor), Substation layout, Selection of High Voltage & Extra High Voltage) Cables, Neutral Earthing, Code of practice for selection, installation, maintenance & protection of Transformers

Circuit Breakers above 650 volts (Including High Voltage & Extra High Voltage) :-
Types, operation, Marking & Breaking current, Selection, Maintenance, Various types of Control gears

Other High Voltage/ Extra High Voltage equipments :-
Installation & maintenance in Plants and Switchyards

Power factor improvement :-
Capacitor bank, reactors, Installation, maintenance & protection of such Equipment

Testing / Voltage :-
Of High Voltage/ Extra High Voltage equipments prior to commissioning, Current transformers, Potential transformers, various types of protective relays

Earthing Practices, Statutory provisions of earthing, Types & Sizes of Earth connections.

A working knowledge of the **C.E.A (Measures Relating To Safety And Electric Supply) Regulation, 2010** provisions of the as applicable to installation works of this part.

Note:-

A candidate must pass in **parts I, II, III & IV** before appearing in an examination for **Part-V.** Provided that they may appear for all the parts at same examination but will not be granted a certificate in **Part – V** should they fail in either **Part – I, II, III & IV.**

PART – VI

OVERHEAD LINES EXCEEDING 250 VOLTS.

For (A) Voltages upto 650 volts
For (B) Voltages upto 33000 volts
For (C) Voltages exceeding 33000 volts

Simple calculations and general principles of construction of low, medium and high voltage lines, General practical knowledge of erection under varying climatic conditions, Size of conductors, length of spans, sag, strength of poles, spacing of conductors, the uses of guys, stays, struts, guard wires, cross arms, insulators, brackets, safety devices, lightning conductors and arrestors, erection parameters of installations during road crossing, railway and river crossing. Effect of temperature, wind pressure, ice and snow, tension on wire. Testing of the installation, Fault location and earthing.

Service Connection, Service line, Service connection at low and medium voltage, High Voltage (11 KV) service connection, Preparation of Estimate, Service connection Estimate, Single Phase, Service connection Estimate, Three Phase, Estimate of 11 KV service connection.

A working knowledge of the **C.E.A. (Measures Relating To Safety And Electric Supply) Regulations, 2010** as applicable to installation works of this part.

PART – VII

UNDERGROUND CABLES

For (A) Voltages upto 1100 volts
For (B) Voltages upto 33000 volts
For (C) Voltages exceeding 33000 volts

Poly Vinyl Chloride (P.V.C), Flame Retardant Low Smoke (FRLS), Cross-Linked Polyethylene (XLPE), Paper, Oil-filled, Gas-filled or any other type of cable as applicable for different classes of voltage. Selection of cables.

General practical knowledge of laying cables direct in ground, in duct, in trays and in pipes, unreeling from cable drum, handling, bending, jointing, plumbing, cable-end boxes, underground and above ground joint boxes, junction boxes and distribution boxes and pillars, joint box compounds, melting of compound and filling of boxes with compound, Straight through joints, crimping and end termination for indoor and outdoor type. Testing of the installation, Fault location and earthing.

Service Connection, Service line, Service connection at low and medium voltage, High Voltage (11 KV) service connection, Preparation of Estimate, Service connection Estimate, Single Phase, Service connection Estimate, Three Phase, Estimate of 11 KV service connection.

A working knowledge of the **C.E.A. (Measures Relating To Safety And Electric Supply) Regulations, 2010** as applicable to installation works of this part.

PART – VIII

ELECTRICAL LIFTS & ESCALATORS

General principles, installation, maintenance and connection of Alternating Current (A.C.) and Direct Current (D.C.) motors upto 650 volts, various types of controllers / speed controllers and safety devices as used in lifts and escalators.

Precommissioning test & other protective devices including auto-rescue device, fire lift.

(**N.B.:- C.E.A (Measures Relating To Safety And Electric Supply) Regulations, 2010** does not extend beyond the electrical equipment installed and used in lifts).

PART – IX

ELECTRIC SIGNS, ELECTRONIC DEVICES CONSERVATION OF ELECTRICAL ENERGY

Various types of Electric lamps, electric discharge lamps, Electric signs, luminous tubes, flashers, level of illumination, installation, connection, operation, controls and safety precautions to be taken.

Electronic Components	:-	Resistor, Capacitor, Inductor, Colour Codes.
Semi-conductor devices	:-	Diode, Transistor, Thyristors / Silicon Controlled Rectifier (SCR), Behaviour of diode, p-n-p & n-p-n transistors, SCR, Diac, Triac, Testing & applications.
Assembly and Testing of:- Electronic Apparatus		Electronic ballasts, Electric fan regulator, Full wave bridge rectifiers and Filter circuits, Poly phase Alternating Current(A.C) to Direct Current (D.C) Bridge rectifier, Inverter, Voltage stabilizer.
U.P.S.	:-	Components and Applications..
Computer	:-	Installation & special earthing requirement

Conservation of Electrical energy in residential, commercial and industrial installations. Various types of no-conventional electrical energy sources and their applications.

A thorough knowledge of the special instructions for such signs as issued under **C.E.A (Measures Relating To Safety And Electric Supply) Regulations, 2010.**

PART – X

WIRING FOR SYSTEMS NOT EXCEEDING 250 VOLTS

Cleat, Poly Vinyl Chloride (P.V.C) casing, lead covered, conduit and armoured cable including Fire Retardant Low Smoke (FRLS) cable, main switches and cut-outs, distribution boards and installation of switches and pre-commissioning test.

Low voltage electrical appliances of common use such as heaters, cookers, small motors for pumps, refrigerators, electric bells and indicators works of electric supply lines whether portable of otherwise and their installations, Earthing, protective devices such as MCB, RCCB, ELCB, MCCB & Isolators .

Low voltage overhead lines :- General principles of construction, type of poles, types of insulators and their uses, stay set complete, types of ACSR size and uses, length of spans, spacing of conductors, height of conductors, cross-arms, guard wires, safety devices, Earthing, lightning conductors and arrestors. Pre-commissioning tests.

Estimating Electrical Wiring of a building, Procedure of Estimating, Plan and specification, Electrical schedule, Load and no. of circuits, Wiring Plan, Size of cables, Sub-circuit schedule, Material calculations.

A working knowledge of the **C.E.A. (Measures Relating To Safety And Electric Supply) Regulation, 2010** as applicable to installation works of this part.

PART – XI

TRANSFORMER INSTALLATION EXCEEDING 650 VOLTS.

Transformer :-

General principle, elementary calculations, name plate details as per Indian Standard (I.S.) Codes of practice, various types of uses, installation, wiring connections, testing, operation, winding connections, phasing out and parallel operations, off-load tap changing, installation & maintenance of outdoor & indoor type transformer including load break switch fuse unit, isolator and lighting arrestors, protection, safety precautions, equipment & neutral earthing.

A working knowledge of the **C.E.A. (Measures Relating To Safety And Electric Supply) Regulations, 2010** as applicable to installation works of this part.

Note:- A candidate must pass in parts **I & II** before appearing in examination for **Part-XI** provided that he may appear for all parts at the same examination but will not be granted a certificate in **Part-XI** should he fail in either of parts **I & II.**

PART – XII

MINING INSTALLATIONS

(Regulations as required by the department of Mines, Govt. of India)

Candidates for this part must have a minimum of two years experience in electrical installation of mines

- Type of power and trailing cable used both in underground and open cast mines. Maintenance practice and cable jointing.
- Basic knowledge on Electrical shovel, dragline and field switches.

- Installation and maintenance of electrical winder, haulage, pump and electrical equipments in Coal cutting machine, loader, conveyor, road header, shearer and continuous miner, drill machine and their gate and box.
- Flameproof(FLP), intrinsically safe circuit, voltage limits for surface and underground installation, specific provision for gassy mines.
- General familiarity of Central Electricity Authority Regulations and Chapter IX related to mines.

Compulsory Group of Parts **I, II, IV, VI(A) & VII(A)** for Part **XII**

A candidate must pass in Parts **I, II, IV, VI(A) & VII(A)** before appearing in an examination for part **XII**.

Note: (1) Those candidates who desire a certificate for supervising high pressure work below ground must also qualify in Part **V.**

Note: (2) Any person who holds a certificate for Mining Installations (Below ground) shall also be entitled to supervise surface installations of the nature covered by the syllabus for the parts in which he/she was qualified.

Note: (3) For the supervision of Electrical installation below ground in gassy mines, persons who hold certificates for supervising electrical installations in mines below ground shall have their certificates endorsed for supervising such installations in " gassy mines" if they can produce satisfactory evidence that they have a minimum of six months' practical experience of electrical installation in "gassy mines" underground.

22. Candidates are not expected to have memorized knowledge of the **C.E.A. (Measures Relating To Safety And Electric Supply) Regulation, 2010**, but they are expected to be able to apply them to give a reasoned explanation of their meaning in any particular case, so far as the electrical installation work is concerned. In the examination, they will be permitted to use a copy of the Regulations.

23. Grant of Certificate of Competency to Supervising Workman:-

1) Every candidate who qualified in the examination under this chapter shall be recommended for a certificate of competency in **Form-B**.
2) The Board may recommend any other person for a certificate of Competency in Form-B who has fulfilled the requirements of **Clause-12** and satisfied the Board that his technical qualifications and practical experience are such as to justify the grant of a certificate of Competency without requiring him to sit for the examinations.
3) On recommendation of the Board, the State Government may grant a Certificate of Competency to Supervising Electrical Workman whereupon a holder of such certificate shall be entitled to supervise the class of installation works as may be specified in the certificate.

Provided that Certificate of Competency to Supervising Electrical Workman issued by other State Licensing Boards may be recognized on reciprocal basis on submission of application in prescribed form along with prescribed fee in cases where Electrical Contractors registered with the State Licensing Board are engaged in the State.

24. Renewal of Certificate:-

Certificate of Competency to Supervising Workman granted under these regulation shall be for a period not exceeding **10(ten)** years provided prescribed fee for the certificate is deposited by the person concerned and such fee shall not be refunded on any account.

The certificate shall be renewed every **10(ten) years**. The application for renewal along with the original certificate and treasury challan, showing deposit of prescribed renewal fee, should

be submitted to the Secretary, at least **1(one)** month before the date of expiry. In case a person fails to renew his certificate before the date of expiry, he may, on payment prescribed late fee, apply to the Secretary, within **1(one) year** from the date of expiry and such application shall be accompanied by:

i) **Original Certificate.**
ii) **Treasury Challan** showing deposit of late fee in addition to prescribed renewal fee.

CHAPTER – VI

FEES FOR EXAMINATION, LICENCE / CERTIFICATE & FOR RENEWAL:

37. Following fees shall be levied under these regulations and the fees once deposited will not be refunded on any account.

a) For Examination:

i) Operative Electrical Workman:

With every application in Form – A for Operative Electrical Workman Certificate Examination under Chapter-III, a fee of ₹.**200/- (Rupees two hundred only)** is to be deposited for compulsory paper (i.e. for written examination).

Additional fee of ₹.**50/= (Rupees fifty only)** is to be deposited for practical Examination and Oral tests only for each of the classes under sub-regulations **a (i) & (ii), b. c. d. e. f. g. or h** of **clause- 17(ii).**

A person holding valid certificate of Operative Electrical Workman and desires to increase the scope of his certificate shall submit a fresh application in **Form-'A'** with a fee if ₹.**50/= (Rupees fifty only)** for each of the classes under **clause 17(ii).**

ii) Supervisory Certificate:

With every application in **Form-A** for Certificate of Competency to Supervising Workman under **Chapter-IV**, an Examination fee of ₹.**300/= (Rupees three hundred only)** is to be deposited for **2(two)** parts at a time and ₹.**100/= (Rupees one hundred only)** for each additional part or sub-part of **part VI & VII**. A Supervisor holding a valid certificate of competency granted under **Chapter-IV** of this regulation and desires to increase the scope of his certificate shall submit a fresh applications in **Form-A** with a fee of ₹. **100/= (Rupees one hundred only)** for each part of sub-part **VI & VII** of the **clause-21(c).**

The fees for Practical Examination and Oral test only shall be ₹.**150/= (Rupees one hundred fifty only)** for each additional part and sub-part of **part VI & VII** and the person concerned is to submit application in **Form-A** along with the required fees.

b) For Certificate:

i) On basis of the performance in the Examination /Interview, when a person is declared eligible for granting certificate, he will be required to deposit following fees for getting the certificate which will be valid for **10(ten)** years from date of issue of the certificate:

For Certificate of Competency to Operative Electrical Workman ₹.**200/-(Rupees two hundred) only**

For Certificate of Competency to Supervising Workman ₹.**500/- (Rupees five hundred) only**

c) For Contractor's License:

Application for Contractor's License is to be made to the Secretary in **Form-'D'** with a fee of ₹.**5000/= (Rupees five thousand only) plus** ₹.**300/= (Rupees three hundred only)** as fee for testing of instrument.

FORM- A

APPLICATION FOR APPEARING IN EXAMINATION

(for Electrical Supervisory Certificate)

(Read the notes on overleaf carefully before filling in this form)

1. Full Name and address of the applicant:-

(In Block letters) with contact No.

2. Fathers name and address :-

3. Date of birth and age on the date of application:-

4. Details of past and present service :-

(Dates of commencement and termination of each appointment to be given)

5. Details of Academic Qualification:-

6. Details of technical Qualification:-

7. Details of Practical Experience :-

8. Examination for which application intends to appear (mention parts / classes specially):-

9. Language in which the candidate desires to be examined. :-

10. Date of Last Examination Roll No :-

(in case appeared previously)

I do hereby declare that the particulars stated above are correct and true to the best of my knowledge.

I am enclosing a Challan No..... dated ..... for ₹.....

Rupees (.....)only.

Signed in my presence.

(Signature of Employer, Magistrate, Gazetted Govt. Officer)

Signature of the applicant

NOTES

1. The application must be signed in the presence of the employer an Honorary Magistrate or a Gazetted Government Officer.

2. 3(three) copies of recent photograph (size 50.3mmx63.5mm) of the applicant must be attached with the application. Applicant must sign (or put thumb impression) on the back side of each photograph.
3. Any person making false statement(s) for the purpose of admission to the examination renders himself liable to be rejected.

4. Incomplete applications is liable to be rejected.

5. If additional space is required for Sl. No. 4, 5, 6 & 7 separate sheet(s) of paper may be used and attached to the form.
6. Photocopy of Citizenship (or Ration Card), duly attested by a Gazetted Govt. Officer, must be attached with the application.