PUC PUBLIC UTILITIES CORPORATION
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Requirements for Application for Certificate of Authorization as an Individual Electrical Contractor

Documentation and Past Experience

- Form D, Application for Certificate of Authorisation as an Individual Electrical Contractor
- 2 x passport photographs
- References from licensed Electrical Contractors which provide proof that you have had practical experience of installing electrical wiring and apparatus for a period of not less than five years
- Copies of certificates from relevant Educational Institutes

Examination

A written examination consisting of two parts:

- Installation Work and Regulations, and
- Related Sciences and Principles

has to be undertaken by the applicant. Note that the applicant must pass both parts in order for the application to be approved. A syllabus is provided for reference.
Each part is a three-hour examination, and is done on separate days due to time constraints. Applicants will be notified beforehand of the time and venue of the examination.

Please note that a calculator will be required for the examination, as well as writing instruments. No mobile phones are allowed to be used during the examination, and **failure to comply will result in instant dismissal of your application**.

Application Fee

Please note that a **SR 525.00** fee will be applied for the application. The fee can be paid at the PUC cashier's offices located at Malavois (Boie de Rose Avenue), Creole Spirit Building (Quincy Street, Victoria) or Anse Royale office; or at PUC B.S.A, Praslin.

THE ELECTRICITY REGULATIONS **FORM D**
(Regulation 16)

Application for Certificate of Authorisation as an Individual Electrical Contractor

1. ……..
of ……..
aged ……years hereby apply for a certificate of authorization as an electrical contractor.

2. I was educated up to the age of …… years at .....
……..

3. I hold a certificate as a wireman issued by the corporation ……..
dated …… ……..

4. Since the issue of that certificate I have had practical experience of installing electrical wiring and apparatus for not less than five years, of which particulars are as follows:-

	Period	**Employer and nature of work**
(a)	from to	
(b)	from to	
(c)	from to	
(d)	from to	

5. I am well known to ……..…… of …….
who can vouch for my good character being my ……..

……
Signature of Applicant

Dated …… ……

NOTE

Certificates and testimonial should NOT be attached to this form.
The applicant should bring them with him when called for interview.

EXAMINATION OF ELECTRICAL CONTRACTOR

(1) Authorization of Electrical Contractors will be carried out by the Seychelles Licensing Authority. No such authorisation can be issued before the applicant has satisfied the Chief Engineer of the Electricity Division that:

(i) he has all the qualifications required for authorisation as an electrical wireman.
(ii) Since obtaining such qualifications he has had practical experience during not less than five years of installing and testing electrical wiring and apparatus of all types.
(iii) he has a competent knowledge of the provisions of that Act and those Regulations and Standards relevant to the installation and testing of electrical apparatus.

(2) A company or firm applying for a certificate of authorisation as `electrical contractors must satisfy the Chief Engineer that one of their directors or partners or the intended manager of the electrical department of their business is an authorised electrical contractor, and they must give and undertaking that such a person will exercise continuous supervision of all the electrical work which they accept, and that in the event of his absence owing to illness or any other cause for seven consecutive days they will replace him by another authorized contractor or come ot such other arrangement as the Chief Engineer may consider appropriate. In any event such an absence must be notified to the Chief Engineer.

(3) A candidate who satisfies the Chief Engineer by virtue of academic qualifications and exceptional experience that he has the required level of competence to hold an authorisation as electrical contractors may be so recommended by the Chief Engineer at his own discretion, without necessarily meeting all the requirements of paragraph (1) above.

(4) SYLLABUS

The syllabus is arranged to guide an applicant in acquiring the practical and theoretical knowledge necessary for him to pass the test.

INSTALLATION WORK AND REGULATIONS

1. Introduction to the basic functions and requirements of an electrical installation. Typical domestic distribution systems including application of consumer control unit
2. The necessity for Wiring Regulations; safety of life and property. Recommended supply voltage for domestic installations and for hazardous situations (for portable and garden tools). Procedure in case of electric shock; artificial respiration. Introduction to I.E.E Regulations and Seychelles Electricity Regulations.
3. Types and sizes of cables used in domestic installations; p.v.c plain and sheathed cables; flexible cords. Methods of preparing terminations, including accessory terminals, sweating lugs and crimping.
4. The need for protection against excess current, shock, fire, corrosion, mechanical damage. Methods of protection against excess current and leakage currents: Use of earth continuity conductor, relative merits of rewirable and cartridge fuses, miniature

circuit breakers with thermal and magnetic trips. Rating and fusing factors: definition of 'coarse' and 'close' protection.

5. The general layout of lighting circuits; connection of consumer's control unit, switches, ceiling roses, lamp holders, socket outlets and plugs and connectors. Making up of lighting circuits including two-way and intermediate switching. Simple checking of circuits.
6. I.E.E Regulations on polarity and earthing. Rating of calbes and flexible cords according to load and voltage drop, use of I.E.E Tables of Ratings. Relevant I.E.E Regulations on installing sheathed wiring systems
7. The general layout of socket-outlet circuits, radial and ring circuits for domestic use. Cooker and immersion heater circuits. Study of I.E.E Regulations for final sub-circuits up to 30 A rating.
8. Use of steel and plastic conduit, steel trunking and ducts; space factor and earthing. Use of correct fittings and accessories. Relevant I.E.E Regulations on use of these systems. Use of mineral – insulated cables and cable glands; I.E.E Regulations of the use of these systems.
9. Wiring of bell-circuits with indicators (simple). Transformer-operated bell system. Relevant I.E.E. Regulations.
10. Simple testing of basic circuits. Use of insulations and continuity tester.
11. Sketching of simple basic objects, e.g. Fixing brackets, sheet metal trunking, terminals and fuses. Simple wiring diagrams.
12. Three-phase, three –wire and four-wire a.c. distribution systems, derivation of two wire circuits form three-wire systems. Distribution centres. Power load; assessment of diversity and growth factors. Switch-board, isolation, control labelling provision of space ways.
13. Systems of distribution within a consumer's installation. Rising mains and ring main system Phasing and balancing of single-phase loads on a polyphase system.
14. Arrangement of an installation to provide discriminative operation of excess current protection.
15. Various types of rigid and flexible conduits including light and heavy gauge steel, aluminium and non-metallic types. Cable trunking systems including under floor and vertical ducts, overhead bus-bar systems.
16. Installation of conduit systems; surface, concealed, loop in.
17. Installation of p.v.c and paper-insulated armoured and un-armoured cables and mineral insulated cables including methods and problems associated with termination (copper and aluminium conductors).
18. General appreciation of installation requiring special consideration, eg. Outdoor installations systems subject to extremes of temperature, flammable or explosive situations, garages.
19. Earthed concentric wiring.
20. Earthing systems; earth loop impedance; construction, application and installation of current-operated earth-leakage circuit-breakers; methods of testing.
21. Insulation, continuity and polarity test on an installation.
22. Fault detection and location.

23. Interpretation and use of layout drawings for installations, including schematic diagrams. Preparation of 'as fitted' drawings
24. Installation and use of voltage and current transformers. Application to protective and measuring circuits
25. Installation and maintenance of secondary cells; use of hydrometer. Charging devices and circuits. Charge and discharge characteristic of lead-acid and alkaline cells. Secondary and emergency lighting systems.
26. Causes and prevention of corrosion with particular reference to electrolytic action
27. Fire alarm systems on open and closed circuit principle with zone classification and indication (general installation practice only)
28. Call systems and burglar alarm systems (general installation practice only)
29. Behaviour and uses of different types of motors and generators; d.c. series, shunt and compound types; a.c three-phase cage and wound-rotor induction motors; single-phase induction motors; split phase, capacitor start, a.c series. Types of enclosure. Rating. Starting methods and circuit diagrams. Means of reversal of rotation. Relevant I.E.E Regulations.
30. Installation, including mounting and lining up of machine.
31. K.V.A rating of a.c plant, power factor; installation of equipment to improve power factor.
32. Maintenance and testing for faults in switch gear, starters and motors; common faults.
33. Construction site installations and safety requirements
34. Lighting. Demonstration of the factors affecting interior illumination levels. Types of lamps and light output and efficiency.
35. Installation of electric signs, discharge lamps and fluorescent tubes. Starting and control gear circuits.
36. Simple types of domestic, water heaters; their installation and control
37. Preparation of requisition for wiring materials required for a simple installation

RELATED SCIENCES & ELECTRICAL PRINCIPLES

38. Mechanics. Force, work, power. Relation between mechanical and electrical units. Triangles and parallelogram of forces. Levers and torque. Moment of force and torque.
39. Heat. Thermal expansion and contraction.
40. Temperature. The Celsius scale, the Kelvin
41. Heat as a form of energy. Units of heat, specific heat capacity, relationship between electrical and heat units; simple calculations. Practical application of the heating effect o f a current : useful applications; overheating of conductors. Conductors, convection and radiation.
42. Lighting. The meaning of the candela, the lumen, the lux. Simple calculations involving the inverse square law.
43. Demonstration of heating, magnetic and chemical effects of electric current. Illustration of applications.
44. Conductors and insulators. Electric circuit. Concept of resistance. Potential difference (in volts) as the cause of current flow. Ohm's Law. Simple calculations

45. Use of ammeter and voltmeter.
46. Series and parallel circuits. Practical applications in heating and lighting.
47. Calculations on resistors in series and in parallel.
48. The primary and secondary cells as sources of electrical energy. Internal resistance. Cells in series and in parallel
49. Resistivity and conductivity
50. Heater elements. Effect of temperature on resistance. Resistance of conductors and voltage drop in cables.
51. Rating of lamps and elements and resistors. Relationship between volts, amperes and watts
52. Electrical safety precautions. Earthing arrangement. Risk and fire and shock. Artificial respiration. Need for regulations.
53. Electro-magnetic devices, bells, buzzers, relays. Simple bell and indicator circuits.
54. Overloads and sort circuits. Causes, effects d protection by fuses.
55. Principles of protection and control by thermal and magnetic devices.
56. Types of supply: d.c single –phase a,.c and the three-phase a.c Potential differences between mains and earth control gear at consumer supply point.
57. Meaning of 'polarity' in distribution circuits. Live and neutral links. Use of double-pole switches.
58. Dependence of resistance on dimensions and materials. Mention of effect of temperature
59. The magnetic field. Flux magnetizing force. Field due to a current through a straight wire loop and solenoid magnetic materials, permanent magnets.
60. Force on a current-carrying conductor in a magnetic field. Basic principles of a moving-coil instrument and direct-current electric motor
61. Fundamentals and examples of electro-magnetic induction (static). The transformer principle.
62. Simple electro-magnetic devices. The electric bell, relay-contractor. The use of moving-iron and moving-coil instruments
63. Principles of telephone and loudspeaker. Simple telephone circuits.
64. The simple generator principle (dynamic); generation of alternating voltage; rectification by commutator.
65. Simple concept of alternating current: wave form, frequency. Root mean square, peak, mean and instantaneous values.
66. Introduction to the basic a.c. circuit. Use of indicator and capacitor.
67. Electromagnetic induction; self and mutual inductance. Induced e.m.f. by change of flux linkage. Energy stored in an energized coil, the switching of inductive circuits. Unit of inductance.
68. Properties of common magnetic materials. Principle of magnetic shielding. Energy losses due to rotation in a magnetic field. Hysteresis. Eddy current. Laminated magnetic systems.
69. Principle of the alternating and the unidirectional generator. Relationship between speed, field strength and generated e.m.f
70. The operation of the d.c machine as a motor or as a generator. The voltage equation ($V=E \pm IR$). Forms of excitation. The production of torque. Load characteristic.

71. The polyphase a.c generation. General concept of a polyphase system. Star and delta connections. Three phase 4-wire and 3-wire s y systems.
72. Production of rotating field by a polyphase winding system. Production of torque in synchronous machines. Starting arrangements.
73. Capacitors; the electric field, electric stress, dielectrics. Series and parallel combinations. The parallel plate capacitor. Unit of capacitance p.d. and charge, stored energy. Working voltage. Safety precautions when using capacitors. Variable and semi-variable air spaced and solid dielectric types. The electrolytic capacitor principle.
74. Resistance and inductance in a d.c. circuit: simple concept of LR time constant. Inductance in an a.c circuit. Phase angle and inductive reactance; inductance and resistance in series, impedance and phase angle.
75. Resistance and inductance in a d.c. circuit: simple concept of LR time constant. Inductance in an a.c circuit. Phase angle and inductive reactance; inductance and resistance in series, impedance and phase angle.
76. Inductance, capacitance and resistance in series: resonance.
77. Two-branch parallel circuit consisting of
    a. inductance-resistance and
    b. capacitance. Effect of resonance
78. Power in a.c single-phase circuits. Power factor. Active and reactive components – kW and KVAR. Power factor correction by static method.
79. Rectifiers. Metal rectifier. Semi conductor diode; meaning of Forward Resistance and Reverse Breakdown Voltage and temperature limitations.
80. Rectifier. Half-wave and full-wave. Average value, use of reservoir capacitor, surge current, ripple voltage, smoothing.
81. Transformers; core construction of shell, ring, and core types. Transformation ratio. Relationship between primary and secondary ampere-turns. Regulation and losses (descriptive treatment). Use of tappings. The auto-transformer. Voltage and current transformer.
82. Instruments; moving coil and rectifier moving coil, moving iron, thermo-couple and dynamometer instruments. Extension of range -series resistors, shunts. Sensitivity ohm/volt. Meter errors in high-resistance circuit, and in low-voltage, low-resistance circuit.
83. Principle of the Wheatstone Bridge network (balanced). Variable standard and variable ration types.