ELECTRICIAN'S LICENCE 'A' (Domestic)

LICENCE 'A' – GENERAL HOUSE INSTALLATION

(Lighting and Domestic appliances)

The Examination for General House Installation Licence 'A' will consist of the following:

(a) Written test in Electrical Theory - Paper I.
(b) Written test in Electrical Installation Technology - Paper II
(c) Candidates who obtain pass marks in Papers I and II will be required to undergo a practical test based on the syllabus, and an oral Examination to test the candidate's general experience and especially his ability to interpret the IEE. Wiring and awareness of the local Electricity Supply Regulations.

Electrical Theory

Paper I - Syllabus

1. Definitions of Electrical Quantities.
2. Electrical units, Quantity and Unit Symbols, dimensional prefixes.
3. Resistance networks, series, parallel and series parallel combinations.
4. Ohm's Law and its applications to d.c. networks.
5. Electrical Power in d.c. circuits.
6. Electrical Energy, Cost of Energy, Single rate tariffs.
7. Resistance of conductors in terms of physical dimensions Resistivity.
8. Voltage drop and power loss in cables. Percentage voltage drop.
9. Insulation Resistance of cables.
10. Heat Energy (specific heat capacity) and Mechanical Energy.
11. Conversion of Electrical Energy into Heat and Mechanical Energy.
12. Illumination, Quantity and Units, Symbols.
13. Cosine Law, Point to Point method.
14. Photometry and Lightmeters.
15. Calculation of illumination by the Lumen Method.
16. Utilisation factor, Maintenance Factor, space height ratio.
17. Principle of operation and simple constructional details of moving coil and moving iron voltmeters and ammeters.
18. Induction wattmeters and energy meters. Use and connections.
19. Differences between primary and secondary cells (brief description, excluding chemical equations.)
20. Concept of internal resistance, e.m.f., and terminal voltage of cells.
21. Cells in series, parallel and series-parallel combinations.
22. Methods of charging, constant voltage and constant current.
23. Capacity of cells. Amperehour and Watthour efficiency.
24. Fundamental Laws of magnetism. Permanent magnets, concepts of magnetic fields, flux and flux density. Quantity and unit symbols.

25. Electromagnetic Induction. Magnetic fields around current carrying conductors.
26. Magnetomotive force. Electromagnets and their applications.
27. Faraday's Laws of Electromagnetic Induction, Induced emf in a conductor. (E = Blv).
28. Difference between AC and DC. Peak, average and rms values of sinusoidal waves. The sine wave and its form factor. Periodic time and frequency.
29. Concept of capacitance, charge and potential. Connections of capacitors in series and in parallel. Division of charge and potential.
30. Resistance, Capacitance and Inductance in ac circuits.
31. Concept of reactance and impedance.
32. AC series circuits containing resistance, inductance, capacitance and their combinations.
33. Effect of frequency on inductive and capacitive reactances.
34. Resonance in series circuits.
35. Power in single phase circuits. Concept of power factor and its effect. Power and apparent power.
36. Measurement of resistance by substitution and direct methods.
37. The Wheatstone Bridge. (Balanced only.)
38. Measurement of insulation and conductor resistance of cables in series and in parallel.
39. Double wound and auto-transformers, principle of operation, application, precautions, advantages and disadvantages.
40. Simple constructional details of core and shell type single phase transformers. Transformation ratio (K = Vs/Vp = Ns/Np = Ip/Is). Simple calculations.

Electrical Installation Technology

Paper II - Syllabus

1. Scope of the IEE Regulations.
2. I.E.E. Definitions.
3. Requirements for safety. Handling of tools and equipment, Precautions and Procedures.
4. First aid.
5. Distribution of electricity from secondary side of substation transformers to domestic premises and small workshops. The T.T. System.
6. Sequence of control in consumer's premises. Circuit diagrams.
7. Assessment of load, maximum demand, diversity and diversity factor. Use of tables.
8. Standard circuit arrangement. Lighting circuits, socket outlets, ring and radial circuits, domestic cookers and water heaters.
9. Need for protection. Fuses and M.C.B.'s. Types and applications.
10. Scope of Earthing. Description of earth circuits and bonding of extraneous metalwork. Testing for effectiveness of earthing. Types of earth electrodes.
11. Special requirements for bathrooms and shower cubicles.
12. Principal application and operation of Earth Leakage Circuit Breakers.
13. Conducting and insulating materials commonly used in electrical installations. Properties, applications, advantages and disadvantages.
14. Wiring systems. PVC sheathed, metal and plastic conduits. Mini trunking and skirting.
15. IEE requirements for conductor joints and terminations. Common joints and terminations.
16. Temporary installations, caravan and outdoor installations (excluding large construction sites).
17. Cable selection, size, use of Rating Factors and Rating Tables.
18. Required size of conduits, conduit capacity and the use of tables. Fixing methods.
19. Electrical space heating and cooking appliances. Use of 3-heat switch, simmerstats and thermostats.
20. Water heating. Pressure and non-pressure type water heaters. Instantaneous water heaters.
21. Bell and call circuits. Transformers, pushes, bells and indicators. Segregation.
22. Burglar alarm circuits. Simple, open and closed circuit types.
23. Construction and application of tungsten filament and tungsten halogen lamps.
24. Construction and application of mercury, low and high pressure lamps.
25. Construction and application of sodium low and high pressure lamps.
26. Lamp circuits. Need for P.F. correction capacitors.
27. Colour rendering, efficacy, advantages and disadvantages of lamps in 23 .. 26.
28. Testing of installations, use of testing instruments. Fault and finding and remedies.
29. Specifications and schedules of quantities.
30. Reading of architects plans, use of graphical and circuit symbols to B.S.S. and I.E.C. (Both accepted.)

Note: Each Syllabus item is to be supported by the relevant IEE regulation.