

# ELECTRICIAN/ WORK ASSISTANT (ELECTRICAL)

PAPER – II  
MARKS – 100

**Unit-I: Basics** (10 marks)  
Fundamental of electricity. Matter, Atoms, Importance of Physics, work, energy. Hand tools- Specifications and uses, Care and maintenance of hand tools. Solders, flux and soldering technique. Resistors- types of resistors & properties of resistors. Definition and properties of conductors, insulators and semi-conductors. Ohm's Law, Kirchoff's Law, Faraday's Law of electrolysis. Safety measures & Elementary first Aid.

**Unit-II : Wiring systems** (15 marks)  
Types of wires & cables, standard wire gauge. Classification of wires & Cables, Insulation & voltage grades. Low, medium & high voltage. Precautions in using various types of cables. Techniques, procedures of Layout of conduit wiring. Use of flame proof and explosion proof. Installation of P.V.C. conduit switches. Types of Earthing- techniques, their relative advantages. Wiring of light & fan circuits. On rolling stick Installation Lighting arrestor/lighting conductor. Complete House wiring Layout. Circuit splitting load wire. I.E.E. rules. Multi-storey house wiring system. Fault finding & repair.

**Unit-III : Switch Gear** (5 marks)  
Definition, Components, Essential features, LV, MV, HV Switchgear

**Unit-IV : Estimation** (5 marks)  
Estimation of lighting scheme, electrical installation of machines and relevant IE rules. Earthing practices and IE Rules.

**Unit-V: DC Motor** (15 marks)  
Principle of D.C. Generator. Fleming's right hand rules. Explanation of D.C. Generators- functions, types and parts. E.M.F. equation-self excitation and separately excited Generators-Practical uses. Use of Ohm meter and Megger. Types and characters of D.C. generators. Series Generators and types Shunt Generators Compound Generators & types. Their applications, simple problems on generator types, capacity etc. Definition of Armature reaction, interpoles and their uses, connection of interpoles, commutation. Electromagnetic drag. Fleming's left hand rule.

**Unit-VI : DC Generator** (15 marks)  
Principle of D.C. Motor. Control, their advantages & disadvantages and industrial applications. Terms used in D.C. Motor Torque, speed, Back-E.M.F. etc. Their relations, practical application and Related problems. Types, characters and practical application of D.C. Motors, Starting of D.C. Motors, 3-points & 4points starters. Types of speed.

**Unit-VII: Transformer** (15 marks)  
Definition of Transformer and classification. C.T & P.T. Instruments and Auto & VARIAC. Construction, parts, working, E.M.F. equation efficiencies, parallel operation & poly phase types and their connections. Cooling, protective devices. Specification, simple problems on

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E.M.F. equation, turns ratio and efficiency. Special transformers. Transformer construction cores winding, shielding, auxiliary parts- breather, conservator, buchholz relay and other protective devices. Cooling of transformer. Transformer oil testing and top changing off load and on load. Transformer bushings termination.

**Unit VIII: Electrical Measuring Instruments (10 marks)**

Types, Forces necessary to work instruments, Moving coil permanent magnet, Moving iron, Range extension, Multimeter, Wattmeter, Energy meter, Frequency meter, Calibration.

**Unit IX : Illumination (10 marks)**

White lights, Thumb rule calculation of lumens. Illumination factors, intensity, human eye factor units, Types of illumination & lamps, Neon sign Halogen, Mercury vapour, sodium vapour, Fluorescent tube, Characters watt ages, fixing places. Types of lighting. Decoration lighting, Drum Switches, Direct & indirect lighting- efficiency in lumens per watt, colour available. S.N. and R.N. Lamps. Placement of lights and ratings.

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