

Indicative Syllabus	
Name of Post	Plant Assistant - Electrical
Minimum Educational Qualification	High School (10th) passed from the Board recognized by GoMP /Govt. of India and Regular ITI trade certificate from institute recognized by GoMP/Govt. of India in Electrician/ Wiremen/ Electronics/ Instrumentation trades.

So No.	Trade Theory
1	Various safety measures involved in the Industry. Elementary first Aid. Concept of Standard.
2	Identification of Trade –Hand tools and their specifications.
3	Electron theory – free electron. Fundamentals of electricity. definitions, units & effects of electric current.
4	Explanation definition and properties of conductors, insulators and semiconductors. Types of wires and cables. standard wire gauge. classification of wires and cable insulations & voltage grades. Precautions in using various types of cables.
5	Techniques of soldering .Types of Solders and flux .
6	Ohm's Law ; Simple electrical circuits and problems. Kirchhoff's Laws and application . Series and parallel circuits. Open and short circuits in series and parallel networks. Law of resistance and various types of resistor.Effect of variation of temperature on resistance.Different methods of measuring the values of resistance.series and parallel combinations of resistors.
7	Chemical effect of electric current and Laws of electrolysis. Explanation of anodes and cathodes. Lead acid cell; Principle of operation and components.Types of battery charging,safety precautions,test equipment.
8	Rechargeable dry cells,description, advantages and disadvantages, care and maintenance of cells. Grouping of cells for specified voltage and current.
9	Lead acid cells general defects remedies. Nickel Alkaline cells description charging power and capacity of cells. Efficiency of cell. Principle and operation of solar cell .
10	Magnetism – classification of Magnets, methods of Magnetizing, magnetic Materials. Properties, care & Maintenance, method of magnetizing magnetic material. Para & Diamagnetism and Ferro material. Principle Of electro – magnetism, Maxwell's corkscrew rule, Fleming left & right hand rules, magnetism field of loop & solenoid. MMF , flux density, Reluctance. B.H. curve, Hysteresis, eddy current. Principal of electro- magnetic induction , faraday law, lenz's law. Electrostatics – capacitor ,different types, functions ,grouping and uses.
11	Resistance - different types of resistors used in electrical ckts. Specification of resistance and tolerance. Effect of variation of temperature on resistance. Different method of measuring the value of resistance.
12	Working principal and circuits of common domestic equipments & appliances.

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13	<p>D.C. Machines – general concept of electrical machines.</p> <p>Principal of D.C.generator</p> <p>Use of armature, field coil, yoke, and commutator, slip ring and brushes laminated core. Explanation of D.C. Generators – types – parts.</p> <p>E.M.F. equation. Self excited and separately excited Generators –practical uses.</p> <p>Brief description of series, shunt and compound generators and their application.</p>
14	<p>Explanation Of armature reaction, interlopes and their uses ,</p> <p>Connection of interlopes,communication</p>
15	<p>DC Motors – terms used in D.C. motor ,torque, speed, Back- e.m.f. etc. there relations practical application. Related problems.</p>
16	<p>Types , characteristic and practical application of D.C. motors. Special precaution to be taken in DC Series motors. Starters used in d.c.motors.</p>
17	<p>Types of speed control of DC motors in industry Word Leonard control, Thyristor/electronic controls.</p>
18	<p>Insulating materials- classifications, properties of common insulting materials.</p>
19	<p>Electric Wirings, importance, IEE rules. Types of wirings both domestic & industrial Specifications for wiring Grading of cables and current ratings.</p> <p>Principle of laying out in domestic wiring testing by meager.</p>
20	<p>Earthing- Principle of different methods of earthing. Plate earthing and Pipe earthing methods and IEE regulations. Importance of Earthing.</p> <p>-Earth Leakage Relay.</p>
21	<p>Alternating Current- Comparison D.C & A.C.,</p> <p>Advantages of A.C. Alternating current & related terms frequency Instantaneous value, R.M.S. value .Average value, Peak factor, form factor.</p> <p>Generation of sine wave,phase and phase difference. Inductive & Capacitive reactance X_L & X_C, Impedance (Z) , power factor,(P.f);Vector diagram. Active and Reactive power, Simple problems on A.C. circuits, single phase & three-phase system etc.</p> <p>Problems on A.C. ckts1. Both series & parallel power consumption P.F. etc.</p> <p>Concept three – phase Star & Delta connection Line voltage, current & power in a 3 ph ckt, with Balanced and unbalanced load.</p>

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22	<p><u>TRANSFORMERS</u> Working principal, construction and classification of transformer. Single phase and three phase transfer turn ratio and EMF equation, rating of transformer. Series and Parallel operation of Transformer. Voltage regulation and efficiency. Auto transformer and instrument transformer (CT & PT). Protective devices. Specifications, simple problems on e.m.f. Equation, turn ratio, regulations and efficiency. Special transformers. Transformer – construction cores winding shielding, auxiliary parts breather, conservator, buchholz relay, other protective devices, cooling of transformer .Transformer oil tasting. Tap changer off load and on load. Transformer bushings and termination.</p>
23	<p>ALTERNATO- Principle of alternator, E.M.F.equation, relation between poles, speed and frequency. Types and construction of alternator. Prime mover, regulation, phases sequence and parallel operation of alternators and brushless alternator.Effect of changing the field excitation and power factor correction.</p>
24	<p>Electrical measuring Instruments- Classification of electrical instrument and essential forces required in indicating instrument PMMC and moving iron instrument. Measurement of various electrical parameters using different analog and digital instruments. Measurements of energy in three phase circuit. Automatic meter reading infrastructures and smart meter. Digital CRO. Phase sequence indicator. Extension of range and calibration of measuring instruments.</p>
25	<p>Laws of illuminations. Types of illuminations system. Illumination factors, intensity of light. Types of lamps. Advantage/ disadvantage and there application. (Neon sign, halogen, mercury vapour, sodium vapour, fluorescent tube CFL, solar lamp). Types of lighting. Decoration lighting drum switches, direct & indirect lighting.Efficiency in lumens per watt, colour available. thumb rule calculation of lumens. Estimating placement of lights and fans and ratings.</p>
26	<p>D.C. m/c winding, Pole pitch ,coil pitch ,back pitch ,front pitch Lap & wave winding Progressive and retrogressive winding.</p>
27	<p>SYNCHRONOUS MOTOR- Working principle effect of change of excitation and load. Application in industry in power factor improvement.</p>

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28	Induction motor Working principle Squirrel Cage Induction motor, Slip ring induction motor. Construction and characteristics starting and speed control. D.O.L Starter, Star /Delta starter, Autotransformer starter. Single phase induction motor- Working principle different method of starting and running (Capacitor start/Capacitor run shaded pole technique). FHP motor.
29	A.C. m/c Winding – Concentric/ distributed, single/ double layer winding and related terms.
30	Universal motor- Working principal advantage, application in domestic appliances and industry .Characteristic, fault location and rectification.
31	Converter-inverter, M.G.Set-description- Characteristics, specifications-running and maintenance.
32	Techniques, procedures of Layout of conduit wiring as per I.S-732-1963. Use of flame proof and explosion of P.V.C conduct switches.
33	Power generation by thermal and hydel power plants, power generation by Solar and wind energy. Corona, Lightning arrestor, Horn gap.
34	Fuse/cut out /kit Kat-function, characteristics and materials. H.R.C Fuses- application. Contactors- Miniature circuit breakers. Relays- thermal, Electromagnetic, solid state relays, Control Relays and protective Relays.
35	Introduction to Basic electronics- Semiconductor energy level, atomic structure 'P' & 'N' type of materials.P-N junction. Diodes- classification of Diodes- Revered Bias and Forward Bias, Heat sink, Specification of Diode and rating.Rectifiers and filters.
36	Explanation and principal of working of a transistor- types of transistors, Characters of a transistors. Biasing and use of transistors. Specification and rating of transistors.
37	Amplifiers, Amplifiers. - class A,B & C power amplifier. working principal Explanation of stages and types. Multivibrator – applications.
38	Explanation and working principle and practical applications of U.J.T.,F.E.T., S.C.R Diac, Triac, power MOSFET, G.t.O & I.G.B.T.
39	D.C/A.C Power control using power transistor, thyristor. Voltage stabilizer, U.P.S. DC/AC motor drives using transistor/ thyristor.
40	Power Supply Stabilizer,Ferro resistant circuit. DC/AC motor drives using Thyristor/Transistor control.

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41	Complete House- Wiring layout. Circuit splitting load wire I.E.E Rules. Multistoried system. Fault finding and trouble shooting of domestic electrical appliances.
42	Decorative lighting Fault finding techniques in Decoration lighting.