



GOVERNMENT OF JAMMU AND KASHMIR,
SERVICES SELECTION BOARD,
Zam Zam, Building, Rambagh, Srinagar.
(www.jkssb.nic.in)

Syllabus for Technician-III (Electrician)

Time= 2.30 Hours.

Total Marks=150

Topics	Marks
Various safety measures involved in the Industry. Elementary first Aid. Concept of Standard Identification of Trade-Hand tools-Specifications Fundamental of electricity. Electron theory- free electron . Fundamental terms, definitions, units & effects of electric current Solders, flux and soldering technique. Resistors types of resistors & properties of resistors. Explanation, Definition and properties of conductors, insulators and semi-conductors. Voltage grading of different types of Insulators, Temp. Rise permissible Types of wires & cables standard wire gauge Specification of wires & Cables-insulation & voltage grades -Low , medium & high voltage Precautions in using various types of cables	15 Marks
Ohm's Law - Simple electrical circuits and problems. Resistors -Law of Resistance. Series and parallel circuits. Kirchoff's Laws and applications. Wheatstone bridge principle and its applications . Common Electrical Accessories, their specifications-Explanation of switches lamp holders, plugs and sockets .Developments of domestic ckts, Alarm & switches, lamp, fan with individual switches, Two way switch .	10 Marks
Chemical effect of electric current-Principle of electrolysis. Faraday's Law of electrolysis. Basic principles of Electro-plating and Electro chemical	05 Marks

<p>equivalents. Explanation of Anodes and cathodes. Lead acid cell-description, methods of charging-Precautions to be taken & testing equipment, Ni-cadmium & Lithium cell, Cathodic protection. Electroplating, Anodising Rechargeable dry cell, description advantages and disadvantages. Care and maintenance of cells Grouping of cells of specified voltage & current, Sealed Maintenance free Batteries, Solar cell.</p> <p>Lead Acid cell, general defects & remedies. Nickel Alkali Cell-description charging. Power & capacity of cells. Efficiency of cells</p>	
<p>ALLIED TRADES: Marking use of chisels and hacksaw on flats, sheet metal filing practice, filing true to line. Sawing and planing practice. Practice in using firmer chisel and preparing simple half lap joint. Drilling practice in hand drilling & power drilling machines. Grinding of drill bits. Practice in using taps & dies, threading hexagonal & square nuts etc. cutting external threads on stud and on pipes, riveting practice. Practice in using snips, marking & cutting of straight & curved pieces in sheet metals. Bending the edges of sheets metals. Riveting practice in sheet metal. Practice in making different joints in sheet metal in soldering the joints.</p>	05 Marks
<p>Magnetism - classification of magnets, methods of magnetising, magnetic materials. Properties, care & maintenance, methods of magnetising magnetic materials. Para & Diamagnetism and Ferro magnetic materials. Principle of electro-magnetism, Maxwell's corkscrew rule, Fleming's left & right hand rules, Magnetic field of current carrying conductors, loop & solenoid. MMF, Flux density, reluctance. B.H. curve, Hysteresis, Eddy current. Principle of electro-magnetic Induction, Faraday's Law, Lenz's Law. Electrostatics - Capacitor- Different types, functions & uses Resistance- Different Types of resistors used in electrical ckts. Specification of resistance and tolerance. Effect of variation of temperature on resistance. Different methods of measuring the values of resistance Working principles and circuits of common domestic equipments & appliances</p>	10 Marks
<p>D.C. Machines - General concept of Electrical Machines. Principle of D.C. generator. Use of Armature, Field Coil, Yoke, and Commutator, slip ring Brushes, Laminated core. Explanation of D.C. Generators-types –parts. E.M.F. equation-self excitation and separately excited Generators-Practical uses. Brief description of series, shunt and compound generators. Expl. Of Armature reaction, interpoles and their uses, connection of interpoles, commutation.</p>	10 Marks
<p>DC Motors - Terms used in D.C. motor-Torque, speed, Back-e.m.f. etc. their relations practical application. Related problems Types, characteristics and practical application of D.C. motors.</p>	10 Marks

<p>Special precaution to be taken in DC Series motors. Starters used in D.C. motors Types of speed control of DC motors in industry Word-Leonard control, Thyristor/electronic controls. Insulating materials – properties common insulating materials, classifications</p>	
<p>Electric wirings, importance, I.E.E. rules. Types of wirings both domestic & industrial - Specifications for wiring – Grading of cables and current ratings. Principle of laying out in domestic wiring-testing by meggar Wiring system - Using casing capping, P.V.C., concealed system. -Maintenance & Repairing data sheet preparation.. Specifications, standards for conduits & accessories Earthing - Principle of different methods of earthing. Importance of Earthing. -Earth Leakage Relay.</p>	12 Marks
<p>Alternating Current -Comparison D.C& A.C. , Advantages of A.C. Alternating current & related terms frequency Instantaneous value, R.M.S. value Average value, Peak factor , form factor. 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. Problems on A.C. ckts. Both series & parallel power consumption P.F. etc. Concept three-phase Star & Delta connection Line voltage & phase voltage, current & power in a 3 ph ckt, with balanced and unbalanced load.</p>	10 Marks
<p>TRANSFORMERS Working principle of Transformer, classification C.T., P.T. Instrument and Auto Transformer/Variac Construction, Single phase and Poly phase. E.M.F. equation, parallel operation of transformer, their connections. Regulation and efficiency, Cooling of transformer, 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 buckholtz relay, other protective devices cooling of transformer Transformer oil testing and Tap changing off load and on load. Transformer bushings and termination.</p>	10 Marks
<p>ALTERNATOR – Explanation of alternator, prime mover, types, regulations, phase sequence, specification of alternators and brushless alternator. Automatic Voltage Regulator.</p>	05 Marks
<p>Electrical measuring Instruments - -types Deflecting torque, Controlling torque & Damping torque , -Moving coil permanent magnet -Moving iron -Range extension -Multimeter -Wattmeter - P.F. meter -Intergrading type, Digital Energy meter – megger. -Energy meter -Frequency meter</p>	10 Marks

<p>- Tri vector meter - Max Demand meter - Phase Sequence indicator - Multimeter – Analog and Digital - C.R.O, Explanation of light White light-illumination factors, intensity of light –importance of light, human eye factor units. Types illumination & lamps - Neon sign Halogen, Mercury vapour, sodium vapour, Fluorescent tube CFL, Solar lamp applications, Concept of Energy - Characters watt ages, fixing places. Types of lighting. Decoration lighting Drum Switches, Direct & indirect lighting-efficiency in lumens per watt, colour available. Thumb rule calculations of lumens. Estimating placement of lights and fans and ratings.</p>	
<p>TRANSFORMER – winding , Principle of different winding techniques D.C. m/c Winding-- pole pitch, coil pitch, back pitch, front pitch , Lap & Wave winding , Progressive and retrogressive winding. SYNCHRONOUS MOTOR - Working principle, effect of change of excitation and load. Application in industry in power factor improvement.</p>	05 Marks
<p>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.</p>	08 Marks
<p>Single phase induction motor- Working principle, different method of starting and running (capacitor start/capacitor run, shaded pole technique). FHP motors. A.C. m/c Winding-- Armature winding terms, coil side, end coil and grouping of coils. Connection to adjacent poles, connected armature winding, alternate pole connection, armature winding. Universal motor-advantages Principle, characteristics, applications in domestic appliances and industry, Fault Location and Rectification. Converter-inverter, M.G.Set-description-Characteristics, specifications-running and maintenance. Techniques, procedures of Layout of conduit wiring as per I.S-732-1963. Use of flame proof and explosion proof, Installation of P.V.C. conduct switches.</p>	07 Marks
<p>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.</p> <p>Industrial wiring. Code of practice & relevant span. Wiring of electric motors, control panel, etc. Types, specifications, advantages of different types of circuit brackets construction and maintenance. I.E.E. rules for overhead service lines, study of U.G.Cables and laying techniques. Working principle and construction of domestic and agricultural appliances-</p>	08 Marks

<p>their maintenance Corona, Lightning arrester/lighting conductor, Horn gap. Introduction to Basic electronics- Semiconductor energy level atomic structure. 'P' & 'N' type of materials –P-N-junction. Diode-classification of Diodes – Reversed Bias and Forward Bias , Heat sink. Specification of Diode – PIV rating. Explanation and importance of D.C. Rectifier ckt. Half wave, Full wave and Bridge ckt. L.E.D. and Solar cells.</p>	
<p>Filter ckts-passive filter. Working principle and uses of an oscilloscope Explanation of principle of working of a transistor- Types of transistors Characters of a transistors Biasing of transistors. Mode of use of transistor. Specification and rating of transistors Explanation of transistor Amplifiers, Amplifiers. – class A,B & C Power amplifier Explanation of oscillator-working principle Explanation of stages and types. Multivibrator – applications. OP-AMP – Working principles and applications. Timer I.C.555 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. D.C/A.C Power control using power transistor, thyristor. Voltage stabilizer, U.P.S. DC/AC motor drives using transistor/thyristor. Power Supply Stabilizer, Ferro resistant circuit. DC/AC motor drives using Thyristor/Transistor control</p>	05 Marks
<p>Digital Electronics -Binary numbers, logic gates and combinational ckts, Flip Flops, Counter, Register & Timer. Complete House-wiring layout. Circuit splitting load wire. I.E.E. Rules. Multistoried system. Fault finding and trouble shooting of domestic electrical appliances. Decorative lighting - Fault finding techniques in Decoration lighting.</p>	05 Marks

Secretary,
J&K Services Selection Board,
Srinagar