

Syllabus for Group-I of RVUN (Electrician/ Power Electrician/ Wireman)
and
for JVVN, AVVN & JdVVN (Electrician/Power Electrician/Wireman/Lineman/SBA)

- Fundamental of electricity.
- Properties of conductors, insulators and semi conductors.
- Types of wires & cables standard wire gauge
- Ohm's Law, series and parallel ckts. Kirchhoff's Law Reading of Analogy digital Ammeter and volt meters only use-of protective devices of ckts- Fuses & their types Earthing etc.
- Lead Acid Cell general defects & remedies. Nickel Alkale Cell description charging. Power & capacity of cells. Efficiency of cells.
- Define-magnetism & classification of magnets. Properties, care & maintenance, methods of magnetizing magnetic materials. Para & Dia magnets and Ferro magnetic substances.
- Principle of electro-magnetism, D.C. Generator & Motor
- Specifications, standards for conduits & accessories. Earthing, laying diagram for Industrial conduit wiring.
- Comparison D.C. & A.C., Advantages of A.C. Alternating current & related terms- frequency, Instantaneous value, R.M.S. value Average value. Peak factor, Load factor, form factor. Generation of sine wave, phase, in phase out phase. Obstructions of A.C. 'R' X_L & X_C . Impedence, power factor, Average power, Reactive power.
- Poly phase Star & Delta connection, Line Voltage & phase voltage, current power in a 3 ph. ckt.
- Explanation of Alternator, prime/mover type, advantages, parts, regulation, phase sequence, specification of alternators & practical places of uses.
- Explanation & Definition of Transformer, classification-C.T., P.T. Instrument and Auto/VARIAC Construction, parts working, E.M.F. equations efficiencies, parallel operation & poly phase types, their connections. Cooling. protective devices. Specifications simple problems on e.m.f. equation, turns ratio and efficiency. Special transformers.
- Single phase motors
- Explanation of Electrical measuring Instruments.
- Layout of conduit wiring as per I.S. -732-1963.
- A.C. and D.C. Winding terms
- Induction motor, Starting & controlling devices.
- Different types of circuit breakers and working.

- Lighting arrestor/lighting conductor
- Study of the arc controlling devices. Explanation and classification & uses of miniature relays.
- Introduction to electronics-conductor-Insulator-semi conductor, energy level atomic structure. 'P' & 'N' type of materials-P-N-junction. Diode-classification of Diodes-Reversed Bias and Forward Bias.
- Rectifier ckt.-Half wave, Full wave and Bridge ckt. L.E.D. and Solar cells. Filter ckts-passive filter. Expl. and importance of oscilloscope working scope.
- Expl. of principle of working of a transistor- Types of Transistors, Characters of a transistors, Biasing of Transistors. Mode of use of transistor.
- Explanation of Megger & types. Use of Megger in fault location in wiring system.
- Earth resistance
- Different types of switches and switch gears
- Explanation of over head bus bar, side bus bar, over head distribution system.

Syllabus for Group – II of RVUN
(Electronics Mechanic/Computer Operator & Programming Assistant-COPA)

- Safety precautions, Elementary First Aid, Earthing types and its importance, Identification specifications, uses and maintenance of hand tools.
- Matter, molecule, atom, Bohr's theory concept only. Electrostatics, Coulomb's law, electric field, Potential, Potential difference, charge, Resistances, Ohm's law.
- Classification of resistors with specifications & use, Construction of resistors, Colour code, Kirchhoff's Law and its application, Explanation and only use of Multimeter, Wheatstone bridge.
- Explanation of magnetism, Classification of magnets and their materials, Properties of magnets, Uses and preparation of artificial magnets, Magnetic needle, Magnetic keepers, Explanation of Electromagnetism, Properties, advantages, application, Types of cores, E.M. relays- types & uses.
- Binary, Decimal, Octal, Hexadecimal conversion from one number system to another. Binary addition, subtraction, 1's & 2's Complements. Subtraction using 1's & 2's compliments. Standard logic gates: NOT, OR, AND, NAND, NOR, Boolean Algebra, Introduction to Flip-Flops & Counters
- Fundamentals of Computers: History, Generation, Types, Hardware & Software
- Functional Block Diagram of Computer, Input Devices & Output Devices.
- Primary Memory Devices: RAM, ROM, PROM & EPROM etc.
- Secondary Memory Devices: Floppy Disk, Hard Disk (Removable/Fixed), Concept of Cylinders, Tracks and Sectors, Advantage and Limitations of Secondary Storage, Access Time, Access Methods (Sequential, Direct, Indexed), CD-ROM & DVD.
- Introduction of Operating System, Basic DOS commands, Basic Shell Commands of UNIX: date, echo, who, is, cp, rm, mv, cd, mkdir, rmdir, chmod, sort, grep, passwd & pwd. Basic Windows Concepts & Operations, Single user vs. Multi-user environment, Multi tasking and Multi processing.
- Machine, Assembly & High Level Languages, Compiler, Interpreters, Assemblers, Basics of Flowcharts with simple examples.
- Basic Introduction of C/C++ language
- MS-Office Suite: MS-WORD, MS-Excel.
- Introduction to DBMS/RDBMS Concepts.
- Basic Concepts of Networking/Communication: Serial and parallel communication, LAN, WAN, MAN etc.
- Introduction to Internet: E-Mail, TCP/IP, FTP, Concept of WebPages & Sites
- Energy band theory of crystals, Difference between conductor, insulators & semiconductors. Intrinsic & Extrinsic semiconductors. Common semiconductor materials. P-type, N-type semiconductors. Temperature effect. Formation of P & N type semiconductor. Formation of P-N junction. Barrier potential. Forward bias. Reverse bias operation & characteristics.

- Diode symbol & equivalent Circuit, Diode characteristics, Static & dynamic resistance of diode, Ideal diode, Different type of diodes, working principle of Zener diode, Tunnel diode, Varactor diode, Schottky diode, LED, Application of Zener Diode.
- Explain of characteristics & uses of UJT, FET, MOSFET, SCR, SCS, SBS, DIAC, TRIAC, I.C., IGBT, GTO, IGCT, PUT.
- Construction and working principle of Generator & Motor, E.M.F. equation of Generator & Motor, Different types of Generator & Motor, Characteristics of D.C. machine, Different methods of speed control of D.C. Motor, Uses of Generator & Motor.

Syllabus for Group – III of RVUN
(Boiler Attendant/ Steam Turbine-cum-Auxiliary Plant Operator)

- Industrial fuels : Solid, liquid and gaseous solid fuels- coal, peat, lignite.
- Coal size grading and moisture conditioning, volatile matter, moisture and ash content, calorific value, fusion of ash and clinkering, Liquid and gaseous fuel.
- Pulveriser (Coal Mill), different types of pulverisers used in modern Boilers.
- Elementary principles of combustion and methods of firing different fuels in boilers.
- Heat transmission: Methods of heat transfer- conduction, convection, radiation.
- Steam generator (Boiler): Types of boilers.
- Principle of steam generation, elementary idea of heat, temperature, volume and pressure, Boyle's Law and Charle's Law. The conversion of water to steam, boiling point of liquid, effect of pressure on the boiling point of liquid, sensible heat, latent heat and total heat, Meaning of saturated steam and super heated steam, dry steam, dryness fraction, importance of dry steam. Use of steam tables, entropy chart.
- Boiler Auxiliaries, mountings and fittings. Super heaters, Re-heater and De-super heaters, Economiser, Soot Blowers, Air pre –heater.
- Draughts- Pressurised and balanced draught system.
- Burners and firing: Arrangements of burner for tangential firing, Importance of furnace purging and how it is achieved.
- Heat Exchangers (heaters).
- Boiler feed water pumps.
- Typical methods of handling bottom ash and fly ash in boilers.
- Elementary knowledge of principles of Lubrication.
- Steam Turbine – fundamental principles, impulse and reaction, Classification of steam turbine.
- Service and steam conditions: High pressure, non-condensing, exhaust steam turbine – high pressure condensing, low pressure condensing, mixed pressure bleader or extraction turbine.
- Turbine plant auxiliaries.
- Governing mechanism.
- Turbine plant operation.
- Feed water systems: Hard and soft water, Hardness-permanent and temporary. Boiler feed water conditioning, open feed water systems and closed feed water system, de-aeration.
- Condenser, extraction pump, etc. emergency stopping of turbine, alarm and safety devices.

Syllabus for Group –IV of RVUN
{Welder (Gas & Electric) / Fitter}

- First Aid-importance of welding in industry-safety in Manual Metal Arc Welding, Safety in Oxy-Acetylene Welding.
- Gas Welding Hand Tools-Uses.
- Difference Process of metal Joining-Bolting-Riveting-Soldering-Brazing etc.
- Oxy-Acetylene Cutting Equipment.
- Uses of Electricity as applied to welding-Electricity-AC-DC-Types of Electric Welding and applications.
- Types of Oxy-Acetylene flames-Their setting-Flame Temperatures and their uses.
- Welding joints. Edge preparation.
- Structure of Oxy-Acetylene flame. Effect of each element on metals.
- Principle of Arc Welding-Necessity of Welding Machines-Types of Machines-Advantages and disadvantages:
- Arc and its characteristics-Arc length-types-Uses-Advantage and disadvantages. Polarity-Types-Method of identification-Uses of each type wrong polarity.
- D.A. Cylinder-Description-Method of Charging.
- Welding positions-Flat-Horizontal-Vertical and overhead. Electrodes-Types.
- Effect of Moisture on Electrodes-handling of electrodes for better welding quality.
- Faults in gas welding-definition of faults, their effects-Causes-Corrections.
- Welding Technique-Right Hand-Left Hand.
- Distortion in Arc Welding-Causes and effects. Methods employed to minimise its effects.
- Effect of atmosphere on metals.
- Fusion Welding of Cast Iron.
- Welding of copper by gas-procedure.
- Welding of High carbon steel-Low and Medium alloy steels.
- Welding of aluminum and-Edge preparation.
- Inspection and Testing of Weld-Destructive Non-destructive test-Semi-Destructive.
- Introduction to CO₂ Welding, CO₂ Welding Equipments and Accessories, Welding Wires used in CO₂ welding.
- Marking media Marking blue Prussian blue-red lead, chalk and their special application.

- Types of files convexing taper, needle care and maintenance of files, various types of keys, allowable clearances & tapers: types, uses of key pullers.
- Physical properties of engineering metal, Mechanical properties.
- Micrometer outside and in-side- principle constructional features .vernier callipers.
- Hand tools: Hammers, welding description, types and uses, Machines and accessories, welding transformer, welding generators, description principle, method of operating.
- H.P. welding equipment description, principle, method of operating L.P. welding equipment, description, principle, method of operating types: Joints-Butt and fillet as per BIS specifications.
- Oxygen cutting machine description, parts, uses, method of handling cutting torch-description, parts function and uses. Gases and gas cylinder-description. Kinds main difference and uses.
- Safety precautions to be observed while working on a lathe. Lathe specifications, and constructional features., .
- Preventive maintenance objective and function of P.M. section inspection. Visual and detailed lubrication survey system of symbol and color coating.
- Bolts and nuts: Material types (Hexagonal and square head) and their uses.
- Washers: Material, types (Spring, tab, plain washer and Fiber washer).
- Bearing-introduction, classification, Roller and needle bearings, Bearing metals.
- Pipes and pipe fitting commonly used pipes. Pipe bending methods. Use of bending fixture, pipe threads-Std. pipe threads Die and Tap, pipe vices.
- Power transmission elements. The object of belts-their sizes and specifications material.
- Power transmission-coupling types-flange coupling-Hooks coupling-universal coupling and their different uses.
- 'V' belt pulleys-standard calculation for determining size crowing of pulleys width of faces.
- Most common form spur gear, set names of some essential parts of the set.
- Method of fixing geared wheels for various purpose drives.
- Lubrication and lubricants. How lubrication is done. A good lubricant, viscosity of the lubricant. Main property of lubricant.