SYLLABUS FOR

MECHANIC RADIO AND TELEVISION

UNDER

CRAFTSMEN TRAINING SCHEME

As approved by
GOVERNMENT OF INDIA

In consultation with
THE NATIONAL COUNCIL FOR
VOCATIONAL TRAINING

Issued by
GOVERNMENT OF INDIA
MINISTRY OF LABOUR
DIRECTORATE GENERAL OF
EMPLOYMENT & TRAINING
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Sole Publishers & Distributors of
all Trades Syllabi

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LIST OF MEMBERS WHO ATTENDED THE TRADE COMMITTEE MEETING

Sl. No.	Name & Designation	Organisation
	S/Shri	
1.	H.N. Pradhan Asstt. Station Engineer	Doordarshan Kendra, Calcutta
2.	D. Ray H.O.D. of Electrical Engg. & Prof. Incharge, Learning Resources Centre	T.T.T.I, Calcutta
3.	N.C. Samanth Scientific Officer-SF	V.E.C. Centre 1/AF, Bidhan Nagar, Calcutta
4.	B.N. Gupta Scientific Officer/SF	– do –
5.	R.K. Dutta Technical Manager	W.N.E.L., Salt Lake, Calcutta
6.	Anjan Ghosh Manager, Total Quality Management	Philips, Salt Lake, Calcutta
7.	Sekhar Chatterjee SE/SB	E.R.T.L. (E), Salt Lake, Calcutta
8.	Swapan Chaudhuri Dy. DIT, W. Bengal	D.I.T., West Bengal
9.	Romen Chakraborty Dy. Director of Craftsmen Training	Directorate of Employment & Craftsmen Trg. Assam, Guwahati
10.	S.R. Majumdar Director	CSTARI, Salt Lake City Calcutta - 91
11.	S.R. Pal Jt. Director of Trg.	– do –
12.	C.R. De Jt. Director of Trg.	– do –
13.	R.M. Sinha Jt. Director of Trg.	– do –
14.	P.N. Banerjee	– do –

General Information

Name of the Trade	:	Mechanic Radio and Television
N.C.O. Code No.	:	854.40
Entry Qualification	:	Passed in 10th class examination under 10 + 2 system of education with Science or its equivalent.
Duration of Craftsmen Training	:	2 Years

Period of Training : 2 Years

The syllabus given below is a guide for the instructors to prepare their own schedule of training. The portion in respect of different subjects which has been intimated against different weeks may be adjusted according to the training schedule prepared by the Instructors concerned. While teaching Engineering Drawing, emphasis should be laid on freehand sketching, blue print reading, drawing of Circles and parts related to the trade. Similarly emphasis should be given on problems related to the trade according to the syllabus for Workshop Calculation and Science.

BIS publications for components and measurements for Radio and TVS are available as standard publications. The Instructors should emphasis the use of these specifications during course of teaching.

Theory	Practical	Engineering Drawing	W/shop Calculation & Science
2	3	4	5
a) Organisation of the Institute, departments, various trades & functions. *b*) Types of work, responsibility to be undertaken, incentives and future Planning of profession.	(*a*) Visit to the Institute. (*b*) Introduction with the Principal and other Teaching Staffs.	What is Engineering Drawing ? Importance, Free Hand Sketching of St. lines, rectangles, polygons etc.	Introduction to electricity supply systems.

2	3	4	5
c) Safety Precautions to be observed in the trade both during 'Theoretical Periods & Practical hours/Workshop hours'	(c) Demonstration of various system of the 'Trade' like Radio, Tape, T.V., controls etc.		
d) Elementary First Aid.	(d) Care and Safe working habits, safety precautions to be demonstrated to the trainees.	Free hand sketching of tools, Reading of simple drawings and concept of dimensions and dotted line, chain line etc.	Properties and uses of metals and non-metals related trade.
(e) Earthing types and importance.	(e) 'Elementary First Aid' Practice, 'Artificial respiration' practice.		Copper, Zinc, Tin, Aluminium, Brass, Bronze.
Identification, specifications, uses and maintenance of hand tools.	Demonstration & uses of trade hand tools. Screw driver, pliers etc. Simple mechanical fixtures, types of screws, bolts, washers, clamps, rivets, taps, connectors. Simple fitting practice, fitting and drilling practice. Simple threading	Reading of simple drawing, Free hand sketching of simple solids with dimension.	Solder Timber, Rubber, Different types of P.V.C. materials used in Electronic Industry.

2	3	4	5
	practice, Simple Sheet metal works. Demonstration on Phenumatic screw driver.		
Matter, molecule, atom, conductor, insulator, Semiconductor and their classifications, Voltage, current, resistance, Ohm's Law, specific resistance & S.W.G. Basic concept of soldering.	Identification of conductors, Insulator with specifications. Use SWG. Demonstration of different soldering iron. Practice of soldering & desoldering. Practice of simple series & parallel ckts. & mixed ckts. Verification of Ohm's Law.		
Classification of resistors with specifications & use.	Identification of resistors. Colour code practice. Use of multimeter for measurement of voltage, current and resistance.		
Construction of resistors. Colour Code. Kirchhoff's Law and its application.	Experiments of P.T.C. resistors " on NTC resistors	Free hand sketch of solids viewed perpendicularly to their surface and axes.	Use of different sheets, ferrous and non-ferrous Decimals addition,

Explanation and only use of multimeter.	" on Thermistor " on VDR resistors " on LDR resistors Test on and use of classified resistors carbon (various W/W POT (Log & Linear) Preset etc.		subtraction multiplication, division, conversion of decimals to common fractions and vice versa.
Explanation of cells. Leclanche cell, primary cells, battery construction, charging rate. Efficiency, Amp. hr. capacity. Types of charging, Silver oxide L.C.R. bottom cells. Alkali cells-construction, Charging efficiency - use advantages.	Maintenance of primary and secondary cells, Use of cells and battery in circuit. Preparation of charging by a charger. Use of Sp. gr. tube/ Hydrometer.	Free hand sketches on nuts & bolts with dimension from samples. Ckts. & wiring diagram.	Reduction of common fraction to decimals fraction. Brief description of manufacturing process of steel Copper, Al.
Explanation of magnetism. Classification of magnets and their materials. Properties of magnets. Use and	Demonstration on the properties of Artificial magnets. Use of magnetic needle. Simple practice of converting a	Expl. of simple orthographic projection 1st angle.	Metric system metric weights and metric measurements, units conversion factors. Manufacture

2	3	4	5
preparation of artificial magnets. Magnetic needle. Magnetic keepers. Explanation of Electromagnetism Properties, advantages, disadvantages application. EM relays-types uses. Concept of generators & motors only. Principle-classification. To build up EMF in a generator. Starting of a D.C. Motor only miniature motors.	magnetic material into a magnet by a bar magnet. Preparation of a solenoid. Use of magnetic needle. Preparation of electro magnets for a calling bell/buzzer. Preparation of E.M. relays. Testing of types of relays. Rewinding of E.M. Relays, and small repairs. Building of E.M.F. in a generator, starting of a D.C. shunt motor.		of plastic and resins.
Explanation of A.C. Comparison with D.C. Expl. of induction & induced E.M.F., Faraday's Law, Lenz's Law.	Demonstration of A.C. & D.C. Demonstration on induced E.M.F. Demonstration on L.H. & R.H. rules. Demonstration on Instantaneous values and R.M.S. values.	Expl. of simple orthographic projection 3rd angle.	Meaning of tenacity, elasticity & malleability.
A.C. Generator–Left hand & Right hand rules. Instan-	Demonstration on phase, cycle, 'f' Measurement of		Brittleness, hardness, compressibility and duc-

2	3	4	5
neous values, R.M.S. lues-phase-cycle, Time riod, frequency. Single ıase motor.	A.C. voltages and currents.		tility with examples.
efine-Inductance. Expla- ıtion of Inductive reac- nce-types, specification. ehaviour with A.C. & .C. Impedence Coil con- pt-power factor. Self & utual induction and their ies. Co-efficient of cou- ing. Expl. of Trans- rmer-types-turns ratio- ses-losses-efficiency. ysterisis & eddy current. ypes of cores to be used r L.F., H.P. & V.H.F. ansformer. Defects of ansformer.	Identification of assorted inductive reactances-checking, testing rewinding upto a specification. Impedence & P.F. measurements Demonstration on self and mutual induction. Indentification of assorted transformers-testing and rewinding upto a specification.	Expl. of simple orthographic projection 3rd angle.	The weight of a body, Units of weights & shop problem percentage & its application. Shop problems.

2	3	4	5
xpl. of Capacitance & apacitive reactance. Clas- ification of capacitors with pecification, electrostatic ction, dielectric constants, ıaterials used. Series and arallel connection. Colour odes, application. Behav- our of 'C' in A.C. & D.C. Explanation of resonance- mportance, equations. Series and parallel reso- ıance. Ckt. elements-natu- al resonance, turning volt- ıge gain, Anti resonance kt. Uses in electronic ckts.	Identification and testing of different types capacitors. Colour code practice. Behaviour of capacitor at different frequencies. Determination of resonance Characters for series and parallel. Turning to a given 'f'.	Expl. of simple orthographic projection 3rd angle. Simple isometric drawings, isometric views of simple objects such as square, cube, rectangular blocks. Detailed diagram of electromagnets.	C.G.S. & M.K.S. and their conversion problem. Ratio and proportion shop problems, plotting & reading of simple graphs works, unit of work, energy power.
What is meter ? Importance of meter Classification of meter. Forces necessary to work a meter. M.C. Instruments. M.I. Instruments.	Demonstration on the function of M.C. & M.I. meters. Measurement of resistance, voltage, current, frequency etc. by Ammeter, voltmeter,	Familiarisation and sketching the details of components.	Applied problems. Algebraic symbols addition, subtraction, multiplication, division. Standard algebraic formula

2	3	4	5
Universal instruments. Range Extersion of meters. Need of calibration. Multimeter. Characteristics of meters. Use of meters in different ckts. Use of Multimeters. Servicing, care & maintenance. Use of Insulation tester.	ohm-meter, frequency meter. Expts. on 'range extension' of meters. Use of multimeters. Servicing of multimeters Demonstration on calibration of meters. Demonstration on insulation tester.		$(a+b)^2$, $(a-b)^2$. Simple simultaneous equations with two unknown measurement of friction-examples. Meaning of C.G.
Define 'Semi-conductor', Intrinsic & Extrinsic Semiconductors. Temperature co-efficients. Definition of 'P' and 'N' types of semiconductor, development of P.N. Junction-Barrier potential, symbol. Symbols as per B.I.S.	Film on Semi-conductor Film on PN-junction. Demonstration on Barrier-potential for Ge & Si.	Use of drawing instruments 'T' square, drawing and construction of simple figures. Solids with dimensions.	Specification Gravity Balancing examples.
Expl. of Diode, Classifications of Diodes. Characters	Testing of a Diode. Characteristics of Diode. Character-	Use of different types of scales in inch & millimeters.	Areas of rectangles, circles regular, polygons,

2	3	4	5
of diodes. Varactor diode. Zener diode. Temperature effect. Diode as rectifier-Half wave-Full wave bridge. Coding of Diodes. Study of the diode junction parameter.	istics of Zener-diode. Half wave rectifier ckt. Full wave rectifier ckt. Bridge rectifier ckt.	Lettering numbers and alphabets.	Calculation of areas, volume, weight of simple solids-cubes squares, hexagonal prisms shop problems.
What is a filter circuit Types of Filter circuits Expl. of Hi-pass, Low pass, Band pass filters.	Demonstration on various filter ckts. Assembly, testing & 'L', 'T' & PAI filters. Demonstration on H.P., L.P. & B.P. filter circuits.		Heat and temperature thermometric scales-Fahrenheit and centigrade and their conversion Kelvin, Reumer, Celsius.
Bi-polar junction device, Expl. of transistor, Types of transistor, Tests of transistor. Symbol as per I.S., Biasing of transistor, mode of application. Arrangements of transistor in a ckt.	Identification and testing of a transistor. To study Alpha & Beta of a transistor/characteristics of a transistor (Static and Dynamic). To study the function of a transistor as an amplifier.	Drawing of various electrical ckts, with B.I.S. symbols of ckt. Series and parallel ckt. power transformer, instrument transformer etc.	Meaning of stress & strain, modulus of elasticity, ultimate strength, B-H curve.

2	3	4	5
nditions for the use of nsistor. Current flow in transistor. ALPHA & TA of a transistor. Ther- l run away.			
planation of Amplifier. pl. frequency spectrum. assification of Amplifi- s, Class A,B,C., A-B, .F. amplifier-wave ngth, Hi-fi R.F. ampli- er. Voltage amplifier. nall signal, large signal, ower amplifier types ush-pull, complementary- ymmetry (transformer ss out put) Thermal sta- ility and heat dissipation. iasing and couplings Fre- uency compensation, pre- mplifier. Cas cading of	Demonstration, assembly and testing of a transistor amplifier in Class A,B,C,P-D, Complementary symmetry modes. Assembly, testing and frequency response of a single stage A.F. amplifier and R.F. amplifier. Assembly, testing and frequency response of a five stage amplifier with voltage amplifier and power amplifier. Study of P.C.B. of an amplifier. Fault location and servicing of amplifier. Study of vol. tone, Bass, Treble and master control ckts.	Free hand sketching of plan & elevation of simple objects hexagonal bar, sq. bar, circular bar, tapard bar, hollow bar etc.	Simple problems on lines angles triangles and circles.

2	3	4	5
amplifiers. PCB of amplifier. Vol. control, tone control, Bass control treble control and master control. P.A. system.			
Explanation of power supply. Importance, types-unregulated, regulated-types of regulation Stabilizers types. S.M.P.S. Blocks diagram of Inverter ckts. Blocks diagram of S.M.P.S.	Demonstration of various power supply. Assembly & testing of an unregulated power supply. Assembly & testing of a series regulated, shunt regulated P.S. Assembly & testing of voltage stabilizer as per specifications to be used for a T.V. Refrigerator. Demonstration on U.P.S. system. Assembly & testing of a S.M.P.S. for a C.T.V.	Calculation of areas of triangles, polygons with the aid of trigonometry.	
Explanation of sound propogation, importance of channels in sound system.	Demonstration and testing of various microphones. Identification, testing & servicing	Symbols as per different semi-condevices-L.D.R., V.D.R., Thermistor, & their	Calculation of current & voltage in voltage dividing network using the

1	2	3	4	5
	Explanation of micro phones-types uses specifications etc. Explanation of micro phones types uses specifications etc. Explanation of Loud Speakers types matching of speakers/Horns/Baffles/enclosures. Line transformers.	of microphone spares. Identification testing Servicing of loud speakers. Arrangement of speaker/Horns in a room/ Auditorium for a open gathering Impedance matching.	use in ckts.	thermistor, V.C.R., L.D.R. at different temp., voltage, light intensity etc.
37. & 38.	Definition & Explanation of 'Intercom' system. Block diagram of 'Intercom' system. Explanation of cradles/Receiver-types function and testing.	Demonstration of 'Intercom' system. Study of cradles/Receiver study of Exchanges Study of power supply of 'Intercom' System. Explanation of 'Exchanges' used, Explanation of power supply.	Drawing of A.F. amplifier ckt. with six stage and with types of output P-P. Fault finding and servicing of 'Intercom' system.	DC : calculate current in different resistive network using Diode, Zener in F.B. & R.B.
39. & 40.	Define oscillator, importance, applications to electrical ckts. Explanation of vibration and oscillation.	Demonstration on various oscillators. Study of Feed back in an oscillator ckt. Assembly of A.F. oscillator testing &	Block diagram of an oscillator. Symbols for different wave shapes-square, Saw tooth, Sine, Triangular etc.	Calculation of 'f', v from $f = v/\lambda$, Time Priod Giga Hertz Mega Hertz, Micro Hertz etc.

1	2	3	4	5
	Factors controlling oscillation. Types-A.F., R.F., Feed back, Tank ckt. crystal oscillator. Oscillators-used in Radio ckts, T.V. ckts, Tape recorder, Function Generator. Other applications of oscillators : Tone generation, Remote control etc.	measuring the 'f' of oscillations. Study of an R.F. Oscillator, Fault finding & servicing of oscillator.		
41.	Define modulation, types of modulation-A.M., F.M. P.M. & application. Broadcasting, Bandwidth mod. index. Definition and importance of demodulation.	A visit to AIR station.	Drawing of AM & FM modulated wave at various modulation 100 pc, 50 pc etc.	Determination of velocity ratio, mechanical advantage & efficiency.
42. to 44.	Full explanation of Radio Receiver, superheterodyne Principle of 'frequency changing' Radio chain,	Demonstration on a multiband Radio Receiver. Study of Radio ckt. M.W. - do - Multiband.	Exercise on Blue print reading/ckt. reading of house service connections.	Logarithm-Use of log, tables for multiplication and division.

1	2	3	4	5
	terms used in radio transmission-specification.			
45.	Ionosphere, ground wave propagations, Electromagnetic waves, reflection, speed of transmission, wave length. Explanation of frequency ranges, resonance, Image frequency, acceptor ckt & rejector ckt. Disadvantages of R.F. amplification. Sensitivity and selectivity, Fidelity. Signal to noise ratio. Block diagram of a radio receiver.	Identification of R.F. stage Identification of I.F. stage. Identification of A.F. stage. Study of assorted 'Band switches'. Practice on 'Dial Threading' Study of the PCB of the R/R/ ckt.	Small power ckts, Connection of Ammeter Volt meter, Watt meter Kwh meter with I.S.I. symbol ckt. reading and drawing of different stages of R/R/ Free hand sketching of trade objects.	Determination of efficiency of simple machines-wrench, pulley blocks, wheels and compound axels.
46.	Explanation of tuning section/R.F. section. Block diagram. Antenna ckt, oscillator ckt., Mixer stage. I.F. generation, R.F. amplifier, A.G.C.-types of transistors used. Specifications of Ant. & oscillator coils with types of 'gang condensers' Types of 'band' switches. Used-connections conditions for better selectivity and sensitivity.	Study of R.F. section ckts. of R/Rs for both P.N.P./N.P.N. Ant. & oscillator alignments. Study of different band switches. Fault finding and servicing of R.f. stage. Checking of selectivity. Checking of sensitivity.	Circuits with dynami breaking Drawing of conversion Stage of R/R both PNP/NPN Layout of battery charging ckt. from D.C. shunt generator.	Problems of mensuration, Sq. hexagon, Prism Atmospheric pressure, pressure gauges, absolute pressure properties of matter

1	2	3	4	5
47.	Explanation of I.F., the importance of I.F., range for M.W. & S.W., Ckt. analysis of I.F. stage. Transistors/I.C. used & their characters. Alignment of I.F. Stage. Explanation of detection/demodulation. R.F. by pass. Tuning indicators with their ckt. arrangement types. A.V.C./ A.G.C. line, importance.	Study of I.F. stage of R/R/ for both PNP/NPN. Study of detector Stage of R/R for both PNP/NPN. Study of A.V.C./ A.G.C. ckt. Alignment of I.F.T. for desired I.F. Testing of I.F.Ts, replacement of I.F.Tc and relignment. Fault finding by meter/by signal traces/by scope.	Drawing of I.F. stage of both P.N.P. and NPN ckts.	Different of force on material in such application as extending, bending, twisting and shearing. Trigonometric tables, applied problems.

2	3	4	5
Explanation of audio stage, types of amplification, driver stage, output stage Transistors used. Tone control, Vol. control.	Study of Audio stage, driver stage, output stage tons and vol. control stage Fault finding and servicing.	Details of electrical control pannel.	Calculation of bias Determination of gain of amp. at different load.
Preparation of servicing charts for fault finding of Audio amplifiers in Radio Receivers. Data sheet & History sheet, Replacement charts/equivalent charts. Tech. safety & precautions to be observed.	Servicing practices.	Drawings of C.B. C.E. & C.C. Ckts. Typical voltage amplifier ckt. Drawing of Class A & B amplifier ckt. Different power output stages P-B, complementry symmetry etc.	Simple calculation of power output and biasing.

R E V I S I O N + Need of Standards – types of standards + National standards – diff. standard bodies – implementation.

T E S T

IEVEMENT : At the end of first year, trainee will be in a position to assemble/test and repair different power supplies, Audio amplifier and A.M. radio receivers.

1	2	3	4	5
to 7.	Expl. of magnetic recording principle with block diagram types. Functional use of magnetic tapes, recording heads, erasing heads. Bias oscillator. Reproduction system. Motors used and speed control, speeds of tapes. Care and maintenance Stereophonic recording and reproduction system. Servicing charts. Specification of tapes and tapes and cassettes. Standard Idea of standard Recorder. Idea of enclosures. Expl. of car stereo system. Expl. compact Dicompact Disc system.	Demonstration on magnetic recording play back, Fast forward and reverse. Study of recording and erasing circuit. Study of Mechanical assembly with motor. Cleaning of Heads. Fault finding and servicing. Study of 'A to Stop'. Study of two-in-one circuit. Study of car stereos circuit. Azimuth correction. Demonstration on Cassette player.	Block diagram of a tape recorder. Circuit diagram of O/L relay. Drawing of a limit switch.	Problems of mensuration. General conditions of equilibrium for series of forces on a body. Plotting of graph. Simple problems of graph. Brief description and properties of silicon, Nichrome Silver etc.
to 51.	Expl. of characteristics, uses of V.J.T., F.E.T., to	Study & assembly of a V.J.T. triggered ckt. Study of a ckt.	Drawing of V.J.T. trigger ckt. with I.S.I. symbol.	Problem on mensuration, Atmospheric Pressure,

2	3	4	5
M.C.S., S.C.R. S.C.S., S.B.S. DIAC & TRIAC, ICS-types and uses. Op-amp, Opto-couplers	Using MOSFET study of a ckt. S.B.S. & S.C.S. Study of S.C.R. in D.C.	Power amplifier ckt. with F.E.T., I.S.I. symbols of S.B.S. S.C.S. voltage regulator circuit. Study of S.C.R. in A.C. Study of voltage control by S.C.R. Study of DIAC, Study of TRIAC & DIAC, Study of I.C. ckts - amplifier, switching circuit.	Absolute pressure. Properties of matter. Difference between mass and weight. Motor control ckts A.F. amplifier ckt. in I.C. Remote control by L.S.I. and M.S.I. Block diagram of microprocessor. Flor chart of microprocessor.
Expl. of transmission systems Block diagram. Frequency multiplier. Feeders & Antenna & phase modulation. High voltage power units phase modulation. Police wireless microwave link and satelite communication (Example & Block diagram only). Walkie-Talkie.	Demonstrations on various transmitting systems. Study in blocks the circuits of transmitters.	Drawing of ckt. of signal generator, E.V.M., Function generator, D.C. speed control ckts. with I.S.I. symbols.	Representation of forces by vectors, simple problems on lifting tackles-jig, wall cranes, solution by vectors.

2	3	4	5
Expl. of oscilloscope, Importance, applications. Block diagram. Introduction to VALVE only. Construction & function of C.R.T. - C.R.O. Use of C.R.O. & it's Care and maintenance. Lissajous" fig.	Demonstration a C.R.O. Exam. of 'X' & 'Y' axes controllers. Measurements of D.C. voltages, A.C. voltages, frequency etc. Comparison of waves. Use of 'Scope' in testing & fault location. Practice on scope for measurements. Testing through Lissajous pattern.	Drawing of Block diagram of oscilloscope, C.R.T., circuit diagram of oscilloscope.	General condition of equilibrium for series of forces on a body. Plotting of graph. Simple equation of graphs.
Expl. of T.V. systems, B & W Block diagrams for both Transmitter & Receiver. Idea about video camera. Scanning system. Frame, Field, Raster, Picture elements. Composite video signals, Aspect ratio, Resolution, flickering. Contrast, Brightness, video signal, sound signal, channels, Bands. Explanation &	Demonstration on a B & W T.V. Identification of —different controls. —Tuner, testing & replacement. —Wave trap ckt., tracing & testing —Video I.F. ckt., tracing & testing. —Staggered tuning of video I.F. ckt. —video amplifier ckt., trac-	Drawing of the block diagram of a T.V. set. Drawing of Picture tube —Electronic gum —Deflection yoke —Speaker —Video amplifier ckt. —SWAF —E.H.T. ckt. —Composite video signal —'YAGI' Antenna —the circuit of Wobbulator	Trigonometric function - Use of trigonometric tables. Applied problems. Calculation of areas of triangles, polygons etc. Density of solids, liquids & simple experimental determination. Centre of gravity & simple experiment for its determination. Magnetic deflection theory, Photo conductiv-

	data preparation for — turners : (*i*) Mechanical (*ii*) Electronic (*iii*) Filter ckt SWAF — Video I.F. with staggered tuned — Video amplifier & picture tube — Sweep section E.H.T. — Sound section — Power supply T.V. Antenna - YAGI & Feeder Cables 'C' band antenna, C.C.T.V.	ing & testing. —Picture tube ckt., tracing & testing. —Sweep ckt., tracing & testing. —Horizontal ckt. —E.H.T. —F.M. Sound section tracing & testing. —Power Supply. —S.M.P.S. —S.T.R. —Preparation of servicing charts. —Installation of T.V. antenna & C.C.T.V.	—Videocon camera tube. —C.C.T.V.	ity, demodulation principle.
to)0.	Expl. of colour T.V. Functional Block Diagram. Expl. of ckt. description and test points of : —Tuner —V.H.F.	Demonstration on C.T.V. Identification & use of diff. controls. Identification, Study & Test points of : —Tuner —V.I.F.	Drawing of different tuner diagrams. V.H.F. Channel charts. Typical Video I.F. response curve, staggered tuned amplifier ckt. F.M. detector response curve.	Qty. of heat, specific heat of solid, liquid & gases. Heat gained, heat lost. Problems on mensuration. Resolution and composition of forces. Prin-

2	3	4	5
—A.G.C. —Video Amplifier —Synchronisation & sweep ckt. —Matrix —Picture tube —Sound section —Power supply Preparation of servicing chart/data sheet. Fault finding-step by step. Balancing of white colour.	—Video Amplifier —Sync. ckt —Sweep ckt. —Picture tube —Sound section —Power supply Fault finding. Adjustment of white colour.	Sound section ckt. diagram.	ciple of video recording. Cutting & bending of Aluminium pipes. Principle & calculation for different channels. Calculation of frequencies due to channel interference.

TECHNICAL SAFETY TO BE OBSERVED (Electro-static & discharges) AND QUALITY.

Development of fault flow chart, Data charts, Replacement charts. Test point charts–Showing Voltage and signals for both B & W and CTV. Types of switches, cables, connectors etc. P.O.T.	Use of test instruments for fault finding as per charts.

2	3	4	5
Servicing of V.C.R. & V.C.P.			
Concept of —number system —Binary and Hex. —Gate ckts. —Registers —Counters —7 segment drives —Introduction to micro-processors —Memory —Digital ICs & microproc-essor (Instruction) —Remote control	Building blocks on various Gates and combination of Gates. Assembly and test of Gate ckts. for a desired drive with digital and microproces-sor circuits.		

R E V I S I O N

T E S T

TUDIES :

The Syllabus has already been approved and is same for all the trades.

LIST OF TOOLS/EQUIPMENT FOR THE TRADE OF MECHANIC RADIO & TELEVISION

(For a Batch of Sixteen Trainees)

Sl. No.	Description	Quantity
1	2	3
TRAINEE'S KIT :		
1.	Electronomic Tool Kit	16
2.	Combination pliers 15 cms insulated	16
3.	Long nose pliers 15 cms insulated	16
4.	Diagonal cutter 15 cms	16
5.	End cutting nipper 15 cms insulated	16
6.	Tweezers 10 cms insulated.	16
7.	Heat sink pliers	4
8.	Neon Tester	16
9.	Knob screw driver 10 cms.	16
10.	Screw driver set of 6	4 sets
11.	Philips alignment kit	8
12.	Wire stripper (insulation)	16
13.	Desoldering pump and soldering iron, 25 watt.	16
WORKSHOP TOOLS AND EQUIPMENT :		
14.	Fire extinguisher	2
15.	First aid kit	1
16.	Artificial respiration chart	4
17.	Work benches 120 × 400 × 75 cm	4
18.	Rubber gloves pair	3
19.	Steel rule	1
20.	Scriber 18 to 20 cms	8
21.	Centre punch 10 cms	8

1	2	3
26.	Mallet 8 Oz	2
27.	Tenon Saw 25 cms	2
28.	Chisel wood 15 cms	2 sets
29.	Electronic drill 10 mm with bits all sizes with polishing and buffing accessories.	2
30.	Hacksaw 20-25 cm. adjustable with blade	4
31.	Micro processor Training kit	2
32.	Junior Saw 20 cms	1
33.	File flat 20 cms second cut with handle	2
34.	File flat 15 cm. bustered with handle	4
35.	File half round 20 cms bustered	4
36.	File round 20 cms. second cut with handle	2
37.	File round 20 cms. with handle	4
38.	Instrument files set of 12	2
39.	Vice bench 10 cms jaw	2
40.	Vice bench 5 cms jaw	4
41.	Taps set 2 mm to 10 mm with handle set of 9	2 sets
42.	Dies set 2 mm to 10 mm with handle set of 9	2 sets
43.	Grinder bench electric 15 cm	1
44.	File square 25 mm	8
45.	File triangle 15 mm	4
46.	P.C.B. development kit	8
47.	Tool maker clamp	4 sets
48.	Bench drill 1 mm	1

UIPMENT :

49.	Soldering iron 250 W	2
50.	Soldering iron 60 W	10
51.	Soldering iron 10 W	10
52.	Wire gauge set	

1	2	3
56.	Fractional horse power motor AC/Induction type/ universal type.	2
57.	Transformers constant voltage 500 VA	4
58.	Coil winding machine (Manual)	1
59.	Multimeter (small) voltage, current and resistance	16
60.	DC and AC Ammeter 0-50 mA	2
61.	Multimeters (big) 20 K-ohms/V	4
62.	Moving iron meter 0-1 A	2
63.	Watt meter 5 Amp/250 V	1
64.	PA Amplifier 20 W transistorised	1
65.	Commercial Radio receivers transistorised (various models and portable types)	10
66.	Microphones (Dynamic-6, crystal-2, condenser-2)	10
67.	Head stereo phone and earphones, HI, FI, different types	4 each
68.	Insulation tester 250 V/500 V	2
69.	Service oscillator	8
70.	Signal tracer	2
71.	Function generator	4
72.	Output meter	4
73.	C.R.O. 10 MHz - 5 nos. 20 MHz - 8 nos. Double Trade 20 MHz - 2 nos. 50 MHz - 1 no.	16
74.	Regulated power supply 0-30 volts, 5 amp.	2
75.	Wobbulator or sweep gen. 240 MHz with marker	2
76.	Wobbularscope 1 MHz to 240 MHz	2
77.	Reflex speaker horn type	2
78.	Pattern generator for B/W	1

1	2	3
83.	Tape recorder/two in one/car stereo, with having autoreverse system/stereo tape recorder	1 each
84.	TV receiver (Solid State) (colour and B & W)	2 each
85.	Signal generator (AM/FM) 10 MHz	8
86.	Transistor tester and I.C. tester	2 each
87.	Steel cabinet 120 × 60 × 45 cm	4
88.	Steel lockers with 8 drawer (standard size)	2
89.	Signal injector (Transistorised)	4
90.	Distortion meter	4
91.	T.V. games	4
92.	Loudspeaker column type elect	2
93.	Pulse generator	1
94.	Video cassette recorder	1
95.	Digital Training Kit	4
96.	Discrete component tester	4
97.	Scientific Calculator	8
98.	Colour T.V. Trainer	1