

**MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION,
MUMBAI -51**

1	Name of Syllabus	C.C. IN Audio Visual Technician (301205)																																																													
2	Max. No's of Student	25 students.																																																													
3	Duration	1 YEAR																																																													
4	Type	Full Time																																																													
5	No Of Days / Week	6 Days																																																													
6	No Of Hours /Days	7 Hrs																																																													
7	Space Required	Lab = 800 Sq feet Class Room = 200 Sq feet TOTAL = 1000 Sq feet																																																													
8	Entry Qualification	S.S.C. passed																																																													
9	Objective Of Syllabus/ introduction	<ul style="list-style-type: none">• To develop professional competence in the field of electronics.• To train the students to acquire skills and mastery in the use of electronic circuits.• To train the students to assemble and test the electronic circuits required in the industries.• To train the students to assemble and repair the Audio Visual Equipments.• To prepare for self and wage employment.• To prepare competent electronic technicians for the small-scale industry.																																																													
10	Employment Opportunity	Student can get employment in related establishment.																																																													
11	Teacher's Qualification	Degree in Engineering / Technology																																																													
12	Training System	<div>Training System Per Week</div> <table><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>18 Hours</td><td>24 Hours</td><td>42 Hours</td></tr></table>						Theory	Practical	Total	18 Hours	24 Hours	42 Hours																																																		
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1. DC Circuit

Concepts of electricity, various applications of electricity. Current, voltage and resistance, potential difference, power, electrical energy and their units, advantages of electrical energy over other forms of energy. Ohm's law. Series and parallel Combination of resistors, specific resistance, effect of temperature on resistance, co-efficient of resistance. Kirchhoff's laws, Heating effect of current and concept of electric power. Sources of voltage: Primary and secondary cells. Types of cells: Carbon zinc dry cell, alkaline cell, Zinc-chloride cell, mercury cell, silver-oxide cell, and lithium cell, lead acid wet cell (only brief idea and use).

2. Electrostatics

Coulomb's law, unit charge.

Electric flux and Gauss's Law, Electric field intensity and electric potential

Concept of capacitance and capacitors, units of capacitance, types of capacitors, constructional details and testing specifications

Capacity of parallel plate capacitors, spherical capacitors, cylindrical capacitor.

Energy stored in a capacitor.

Concept of di-electric and its effects on capacitance, di-electric constant, break down voltage.

Series and parallel combination of capacitor. Simple numerical problems of capacitor.

Charging and discharging of capacitor with different resistances in circuit, concept of current growth and decay, time constant in R-C circuits, simple problems.

3. Electro- magnetism

Concept of magnetic field production by flow of current,

Concept of $e m f$, flux, reluctance, permeability, Analogy between

Electrical & magnetic circuits.

Faraday's Laws of electromagnetic induction, self and mutually induced $e m f$.

4. AC theory

Concept of alternating voltage and current, difference between AC and DC.

Concept of cycle, frequency, period, amplitude, instantaneous value, average value, R.M.S. value and peak value, form factor (definitions only.)

Series and Parallel resonance, Resonance frequency, Q – Factor, Band width, LR, RC, and LCR filters explanation with simple circuits only. Types of filters – L, T, and π .

5. Electronic Components / switches / PCB

Resistors: Carbon film, metal film, carbon composition, wound, Cermets and variable types (presets and potential-meters). Rheostat

Special types of resistors: VDR, LDR, Thermostat.

Concept of IC: – Various types of IC's various linear & digital IC's

Inductors and RF coils: Types of Inductors, methods of manufacture, testing, Need of shielding, application and troubleshooting.

Connectors, Relays, switches and cables:

Different types of connectors, relays, switches and cables, their symbols, construction and characteristics, Function of Fuse, construction and application

Loudspeaker and Microphone: Types, applications and specifications of various types of Loudspeaker and microphone.

Accessories for Basic circuit Assembly: Types of wires, lug / tag boards. PCB, types of PCB, Breadboard.

6. Transformer

Principles of transformer, construction, voltage and current transformation.

Current and voltage relationship, autotransformer and its uses, Instrument transformer.

Voltage regulation and its significance.

Need for isolation, Different types of transformers, and specifications of all types of transformers.

Losses in a transformer.

7. Soldering Technique

Principle and working of simple soldering iron, Solder metal, Types of solders, flux, de-soldering and different soldering technique.

PART B

1. Semi conductor physics

Review of basic atomic structure and energy levels, concept of insulators, conductors and semi conductors, atomic structure of Germanium (Ge) and Silicon (Si), covalent bonds.

Concept of intrinsic and extrinsic semi conductor, P and N impurities, doping of impurity.

P and N type semiconductors and their conductivity. Effect of temperature on conductivity of intrinsic semi conductor.

Energy level diagram of conductors, insulators and semi conductors; minority and majority carriers.

2. Semi conductor diode

PN junction diode, mechanism of current flow in PN junction, Drift and diffusion current, depletion layer, forward and reverse biased PN junction, potential barrier, and concept of junction capacitance in forward and reverse bias condition.

V-I characteristics, static and dynamic resistance and their calculation from diode characteristics, applications.

Diode as half wave, full wave and bridge rectifier. PIV, rectification efficiencies and ripple factor calculations, shunt capacitor filter, series inductor filter, LC filter and π filter. Comparison between three rectifiers.

Types of diodes, characteristics and applications of Zener diodes. Zener and avalanche breakdown.

3. Introduction to Bipolar Transistor

Concept of bipolar transistor, structure, PNP and NPN transistor, their symbols and mechanism of current flow; Current relations in transistor; concept of leakage current.

CB, CE, CC configuration of the transistor; Input and output characteristics in CB and CE configurations; input and output dynamic resistance in CB and CE configurations; Current amplification factors. Comparison of CB CE and CC Configurations.

Transistors as an amplifier in CE Configurations; d.c load line and calculation of current gain, voltage gains using D.C. load line. H- Parameters and their significance.

4. Transistor biasing Circuits

Concept of transistor biasing and selection of operating point. Need for stabilization of operating point.

Different types of biasing circuits.

Transistor as a switch.

5. Amplifiers

Introduction, Types of Amplifiers, Various Applications of Amplifiers. Transistor as an Amplifier, Amplifier using IC, Calculation of Voltage, Current and Power gain of an amplifier circuit.

Explanation of phase reversal of output voltage with respect to input voltage.

Concepts, Types of multistage Amplifiers, Construction, working, advantages, disadvantages, frequency response and applications.

Basic principles and types of feedback

Effect of feedback on gain, stability, distortion and bandwidth of an amplifier with negative feedback.

Class A, Class B, Class AB, and Class C amplifiers, collector efficiency and Distortion in class A, B, & C. Comparison between them.

Single ended power amplifiers, Graphical method of calculation (without derivation) of output power; heat dissipation curve and importance of heat sinks. Push-pull amplifier and complementary symmetry push-pull amplifier.

Importance of impedance matching in amplifiers.

6. Wave Shaping Circuits

General idea about different wave shapers.

RC and RL integrating and differentiating circuits with their applications.

Diode clipping and clamping circuits and simple numerical problems on these circuits

7. Oscillator

Principle of oscillator, use of positive feedback in oscillator. Types of oscillators, R.C. Phase shift oscillator. Resonance circuit LC oscillator, Wein bridge oscillator, Colpitts oscillators, Hartley oscillators, and Crystal oscillators.

PRACTICAL - I

ELECTRONIC MATERIAL, COMPONENTS & ELECTRONIC DEVICES WITH CIRCUITS

PART - A

1. Safety precaution to be observed while working with electronic equipments and systems.
2. Drawing electrical symbols as per ISI specifications.
3. Verification of Ohm's law, using resistors in series and in parallel.
4. Measurement of electrical power consumption in simple AC/DC circuit by VI method.
5. Identification of various materials tools and devices.
6. Testing of resistor, capacitors, & semiconductors by Multimeter & colour coding method.
7. Testing of resistors, capacitors, & Inductors by LCR meter / Bridge.
8. Testing of RELAYS verifying conditions, such as normally "ON" and "OFF" etc.
9. Verification of Kirchhoff's Laws.
10. To study the different types of Cable and connectors.
11. Characteristics of Thermostat
12. Characteristics of LDR.
13. To study the Loudspeaker and Microphone.
14. Study of AC and DC sources (power suppliers) available in the laboratory with their specifications.
15. Series & Parallel resonance circuit, determination of its resonant frequency, bandwidth.
16. Testing a transformer, continuity, installation and turn ratio.
17. Measurement of I/P and O/P resistance of power supply & verification of maximum power transfer theorem.
18. Prepare PCB art work and etching using any simple circuit
19. Study of different types of batteries.
20. Study of soldering practice.

RECOMMENDED BOOKS

1. Electronics Measurement and Instrumentation by AK Sawhney, Dhanpat Rai and Sons, New Delhi
2. Electronics Instrumentation by Cooper, Prentice Hall of India, New Delhi
3. Electronics Test and Instrumentation by Rajiv Sapra, Ishan Publications, Ambala
4. Electronics Instrumentation by JB Gupta, Satya Prakashan, New Delhi
5. Electronic components and Materials by SM Dhir, Tata McGraw Hill, New Delhi
6. Electronic Engineering Materials by ML Gupta, Dhanpat Rai and Sons, New Delhi.
7. Electrical Technology, Fifth Edition by Edward Hughes, Longman Publishers
8. Basic Electrical and Electronics Engineering by SK Sahdev, Dhanpat Rai and Sons, New Delhi
9. Electrical Technology by BL Theraja, S Chand and Co, New Delhi
10. Electronic Material and components by K S Patil, BPB Publications.

PART B

1. To study the semiconductor devices.
2. a) P-N Diode Characteristics.
b) Study diode as a clipping and clamping.
3. Transistor characteristics - CE, CB and CC.
4. Study of half wave rectifier with or without filters.
5. Study of full wave rectifier with or without filters.
6. Study of bridge rectifier with or without filters.
7. Zener diode Characteristics.
8. Study of Zener as a voltage stabilizer.
9. Line regulation and measurement of percentage of regulation.
10. Load regulation and measurement of percentage of regulation.
11. Study of single stage CE amplifier with potential divider biasing. Measure the voltages and hence calculate the gain.

12. RC coupled amplifier: obtain the frequency response and calculate the gain.
13. Study of Push pull power Amplifier.
14. Study of commercially available audio amplifier IC (CA 810 or equivalent.).
15. Demonstration experiment of negative and positive feedback concept.
16. Study the integrating and differentiating circuit.
17. Measurement of frequency of Hartley oscillators.
18. Measurement of frequency of Colpitts oscillators.
19. Measurement of frequency of R-C Phase shift oscillators.
20. Measurement of frequency of Wein bridge oscillators.

RECOMMENDED BOOKS

1. Basic Electronics and Linear Circuit by NN Bhargava and Kulshreshta, Tata McGraw Hill, New Delhi.
2. Principles of Electrical and Electronics Engineering by VK Mehta; S Chand and Co., New Delhi
3. Electronic Components and Materials by SM Dhir, Tata McGraw Hill, New Delhi
4. Electronics Devices and Circuits by Millman and Halkias; McGraw Hill.
5. Principles of Electronics by Albert Paul Malvino; Tata McGraw Hill, New Delhi
6. Electronic Devices and Applications Nair, Prentice-hall, New- Delhi,
7. Electronic Devices and Circuit Theory Boylestad & Nashelsky, Prenticehall, New- Delhi, 8th Edition
8. Electronic Devices and Circuits Bell, Prentice-hall, New- Delhi, 4th Edition
9. Functional Electronics K.V. Ramanan
10. Engineering Electronics John D. Ryder
11. Electronic Devices & circuits Mottershead, Allen, Prentice Hall, India, New Delhi
12. Integrated Electronics Millian & Halikyas
13. Electronic devices & circuits, volume- I G.K. Mittal, Khanna Publishers, New Delhi, 22nd 1999
14. Laboratory manual for electronic devices and circuits Bell, Prentice-hall, New- Delhi, 4th Edition
15. Electrical Devices & Circuits Bogart, T.F., Universal Book Staff, New Delhi, 1st , 1991

Theory - II - ELECTRONIC INSTRUMENTATION & DIGITAL ELECTRONICS PART - A

1. Power supplies

Block diagram of load and line regulation, DC or average value, ripple and output frequency.

Concept of voltage regulation using transistor (series and shunt type).

Block diagram and brief description of each block.

Fixed and adjustable types. IC regulators (like 7805, 7905, LM 317), and variable voltage regulator like (IC 723).

Basic principle of S.M.P.S. and its advantages (with the help of block diagram).

Circuit diagram of typical S.M.P.S.

2. Meters

Measurement, method of measurement, types of instruments Specifications of instruments: Accuracy, precision, sensitivity, resolution, range, errors in measurement, sources of errors, limiting errors.

Galvanometer, DC Ammeter, DC voltmeter, Ohmmeter Series and shunt type. Principle of working of above types. Analog multimeter.

3. Impedance Bridges

Wheat stone bridge.

AC bridges: Circuit diagram, advantages, disadvantages, and application of Maxwell's induction bridge, Hay's bridge, De-Sauty's bridge, Schering Bridge and Anderson Bridge.

Block diagram of LCR Bridge /meter and application.

4. Test Instruments

CRO: Block diagram of CRO, Specifications of CRO and their explanation front panel controls, applications of CRO. Types of CRO: - Single beam, Dual trace etc. Application of CRO: - Measurement of current, voltage, frequency, time period and phase using CRO using Internal time base generator. Component testing using CRO. Construction & working of CRT.

Generator: Types of AF generator, RF generator, function generator, and pattern generator. Block diagram and brief description of each block. Application and uses of each.

5. Multivibrator Circuits

Working principle of transistor as switch.

Concept of multi-vibrator: as table, mono stable, and bis table and their applications.

Block diagram of IC555 and its working and applications of IC555 as mono stable and as table multi-vibrator.

6. Digital Instruments

Comparison of analog and digital instruments. Working principle of ramp, dual slope and integration type digital voltmeter.

Block diagram and working of a digital Multimeter.

Measurement of time interval, time period and frequency using universal counter / frequency counter.

LED, LCD, seven segment display, basic operation of various commonly used display devices.

Four bit decoder circuits for 7 segment display and decoder/driver IC's.

7. DC Motor

Principles, significance of back emf, types of motors and their constructions.

Motor characteristics for shunt and series, speed control of DC motors and factors controlling the speed.

Single Phase Motors: Principles, construction, working speed control, starting and applications of the following motors:

a) Induction motor a) Universal motor.

Stepper Motor and Servo Motor:

Types, construction, working and their applications.

8. Other semiconductor devices

Structure, working and application of Diac, SCR, Triac, and UJT. Their characteristics.
Structure, working of FET (N channel and P channel). Features of F.E.T. and applications and characteristics. CMOS – merits & demerits. Comparison of JFET, MOSFET and BJT. FET amplifier circuit and its working principle.
Structure, working of MOSFET (depletion and enhancement type). Features and applications and characteristics.

9. Special devices

Special purpose diodes: Tunnel diode, Scotty, Varactor, Photo, diode, Switching (step recovery), Gunn diode, PIN diode, Laser diode, and Op-to coupler.

PART B

Microprocessor and Digital Electronics

1. Operational Amplifiers

Distinction between analog and digital signal.
Applications and advantages of digital signals.
Operational Amplifiers: Characteristics of an ideal operational amplifier and its block diagram.
Definition of differential voltage gain, CMRR, PSRR, slew rate and input offset current
Operational amplifier as an inverter, scale changer, adder, Subtract or, differentiator, and integrator.
Concept of Schmitt triggers circuit and sample/hold circuit using operational amplifier and their applications.

2. Number System

Binary and hexadecimal number system: conversion from decimal and hexadecimal to binary and vice-versa BCD representation.
Binary addition, subtraction, multiplication and division including binary points. BCD addition.
1's and 2's complement method of addition/subtraction.

3. Logic Gates

Concept of negative and positive logic.
Definition, symbols and truth tables of NOT, AND, OR, NAND, NOR, EXOR Gates, NAND and NOR as universal gates.
Boolean algebra, DE Morgan's Theorems. Various identities. Formulation of truth table and Boolean equation for simple problem. Implementation of Boolean (logic) equation with gates.
Logic family classification: Definition of SSI, MSI, LSI, VLSI.,
TTL and MOS families and their sub classification.
Codes: a) Concept of code, weighted and non-weighted codes, examples of 8421, BCD, excess-3 and Gray code.
b) Concept of parity, single and double parity and error detection
c) Alpha numeric codes: ASCII and EBCDIC.

4. Arithmetic circuits and Latches and flip flops

Half adder and Full adder circuit, design and implementation.

Half and Full Subtract or circuit, design and implementation.

4-bit adder/Subtract or.

Concept and types of latch with their working and applications.

Operation using waveforms and truth tables of RS, T, D, JK, and Master/Slave JK flip-flops.

Difference between a latch and a flip-flop.

4. Multiplexer / De-Multiplexer and Counters

Basic functions and block diagram of MUX and DEMUX. Different types and applications.

Binary counters.

Divide by N ripple counters (including design), Decade counter.

Pre settable and programmable counters.

Down counter, up/down counter.

Synchronous counters (only introduction).

Difference between Asynchronous and Synchronous counters

Ring counter with timing diagram.

5. Shift Register

Introduction and basic concepts including shift left and shift right.

Serial in parallel out, serial in serial out, parallel in serial out, parallel in parallel out.

Universal shift register.

6. Memories

Basic RAM cell, $N \times M$ bit RAM, Expansion of word length and capacity, static and dynamic RAM, basic idea of ROM, PROM, EPROM and EEPROM.

7. A/D and D/A Converters

General principle of A/D and D/A conversion and brief idea of their applications. Binary resistor network and resistor ladder network methods of D/A conversion. Dual slope and successive approximation types of ADCs.

8. Micro processor – 8085

Introduction: Microprocessors – evolution, importance and Application.

PRACTICAL - II ELECTRONIC INSTRUMENTATION & DIGITAL ELECTRONICS PART A

1. Study of different types of motors.
2. Use of PMMC movement to construct multi range ammeter & voltmeter
3. Study Series and shunt type regulated power supplies.
4. Build and study a fixed and variable DC voltage supply using 3 pin IC and test it.
5. Test various components like resistors, capacitors and diodes using CRO.
6. Measure frequency and amplitude using internal time base of CRO.
7. Phase Measurement using internal time base and Lissajous figure.
8. Study and test the Diac, SCR, and Triac.
9. Study and test the FET, JFET, & MOSFET.
10. SCR, Characteristics
11. FET Characteristics.

12. Familiarization of ammeter, voltmeter, multimeter (analog, digital) and understanding their Specifications.
13. Study Different types of LED display.
14. Study seven-segment decoder driver circuit.
15. Study As table multi vibrator using IC 555.
16. Study Mono stable multi vibrator using IC 555.
17. Study front panel of CRO.
18. Study front panel of Pattern generator.
19. Study front panel of AF / RF generator.
20. Study stepper motor with forward and reverse direction circuit

RECOMMENDED BOOKS

- 1 Electrical & Electronic Measurements & Instrumentation
A. K. Sawhney Dhanpat Rai & Sons Publication
- 2 Modern Electronic Instrumentation and Measurement Technique
Elbert D Helfrick & W D Cooper PHI Publication
- 3 Electrical Measurements & Measuring Instruments
Sauryanarayana, Tata McGraw-Hill Publications, New Delhi.
- 5 Electrical Measurement & Measuring Instruments Golding & Widdis.
6. Electronic instruments and instrumentation technology
Anand, Prentice Hall of India, New Delhi, 2004.
7. Electronic Instrumentation & Measurement Bell,
Prentice Hall of India, New Delhi, 2004.
9. Basic Electronics and Linear Circuit
by NN Bhargava and Kulshreshta, Tata McGraw Hill, New Delhi.
10. Principles of Electrical and Electronics Engineering
by VK Mehta; S Chand and Co., New Delhi
11. Electronic devices & circuits, volume-
I G.K. Mittal, Khanna Publishers, New Delhi, 22nd 1999
12. Laboratory manual for electronic devices and circuits Bell, Prentice-hall,
New- Delhi, 4th Edition

PART B

1. Logic gates - AND, OR, NOT, NAND, NOR, EX-OR, and EX-NOR (Using IC's).
2. NAND or NOR gates as an Universal gates.
3. IC 741 (op-amplifier) as Inverter and non-inverter.
4. IC 741 (op-amplifier) as Adder and Sub tractor.
5. Verification of truth tables of RS flip flop using NOR and NAND gates.
6. JK and Master Slave JK Flip Flop.
7. Half Adders - Sub tractor (Using IC Logic gates)
8. Full adder - Sub tractor (Using IC Logic gates)
9. To study details of counters IC's like 7490
10. Observe the output of decade counter 7490 on a seven segment display using a decoder
11. To construct and test 4/8 bit A/D converter using IC.
12. To construct and test 4/8 bit D/A converter using IC.
13. To study shift register IC's like 7495.
14. Study of Multiplexer using IC 74153.
15. Study of De multiplexer using IC 74139.

RECOMMENDED BOOKS

1. Digital Electronics and Applications
by Malvino Leach, Tata McGraw Hill, New Delhi
2. Digital Logic Designs
by Morris Mano, Prentice Hall of India, New Delhi

3. Digital Fundamentals
by Thomas Floyds, Universal Book Stall
4. Digital Electronics
by RP Jain, Tata McGraw Hill, New Delhi
5. Operational Amplifiers and Linear Integrated Circuits
by Ramakant A. Gaykwad

Theory - III - Computer, Multi Media & Audio and Video Systems

PART A

Computer and Multi Media

1. Introduction To Computers

Generations Of Computer.

First, Second, Third and Fourth generation

Hard Ware, Soft Ware, Firm Ware with Examples.

Classification & Applications of Computers.

Micro, Mini, Mainframes and Super- Computers

Applications of computers

2. Microcomputer

Structure & Working of Micro-Computers

Block diagram of computer, Central Processing Unit

Memory Unit, and Input & Output Devices

3. Computer Languages

Classification and characteristics of languages.

a) Machine language b) Assembly language c) High level language

Computer Hardware

Classification of Software: and firmware

System software: O.S. Loader, Linker, Interpreter, Compiler and Assembler

Application Software.

4. Introduction To Operating Systems

Micro-Soft Disk Operating System (MS-DOS)

System files: BIOS, COMMAND.COM, CONFIG.SYS, Autoexec.bat file

MS-DOS Commands.

Internal Commands- dir, cd, md, rd, del, ren, date, time, vol. And copy

External commands – attrib, format, edit, find, disk copy, backup & Restore.

Introduction to different system software.

5. Introduction To Windows Operating System

Concept of Windows-Arranging, Moving, Resizing, Opening, and Closing of windows

Folder/ File Management-Search, copy, delete and rename files and folders

Windows Accessories: Notepad, Word Pad, Paint

Add new hardware and installing drivers

6. Installation and configuration

Display adapter cards :- Needs, Types, Overview of MDA, CGA, EGA, VGA, Study of VGA and SVGA, sound blaster and video blaster cards 2D and 3D accelerators, MODEM cards, Scanner And /Web Camera and T.V. Tuner card.

7. Multimedia as an application of computer in TV/Video

Concept of multimedia

Linking process of TV with computer

Concept of sound blaster

Concept of video blaster

Picture mixing using computer

Picture handling

Computer animation concept use of pinned and other animation software's of multimedia.

Video recording techniques.

Different software used for multimedia.

PART B

Audio and Video Systems

1. Audio System

Microphones: construction, working principles and applications of microphones, their types viz: a) Carbon b) moving coil, c) velocity, d) crystal, e) condenser, e) cordless etc.

Loud Speaker: Direct radiating, horn loaded woofer, tweeter, mid range, multi-speaker system, baffles and enclosures. Brief discussion on cross-over network.

Sound recording on magnetic tape, its principles, block diagram, and tape transport mechanism.

Digital sound recording on tape and disc.

PA system: Draw the block diagram of P.A. System & explain the function of each block.

Know the servicing procedure of PA system.

Impedance matching & voltage matching.

Tape Recorders: Draw the Block diagram of Tape Recorder & explain the function of each block.

Draw the block diagram of Radio-cum-Tape Recorder & explain the function of each block.

Principle of Hi-Fi system, Equalizer circuit, and theater sound system, Dolby system, and stereo systems & surround sound system etc.

Mention the typical faults in Radio-cum-Tape recorder at each stage & their rectification.

2. CD/MP3 and DVD Player

Compact disk structure, Constant linear velocity (CLV) recording system, Advantages of Digital Storage, CD Encoding Process block diagram.

Block diagram of CD Player, Optional Pickup unit components, Idea about servo system and their purpose only a) Tracking servo, b) Carriage Servo, c) Spindle Servo

Different motors used in CD Player & their functions only a) Tray or loading motor (Carriage Motor), b) Slide or sled or feed motor, c) Spindle or Disc or Turn table Motor

Different sensors used in CD player, Different types of CDs., Various parts of CD Mechanism & their function, Various functions carried out by system control processor.

Introduction to DVD Player, Comparison between CD ROM and DVD ROM, Different types of DVD ROM.

Introduction to home Theater System, Installation of Home Theater System

3. CD/MP3 and DVD player servicing

Test Equipment and Tools, safety precautions, Adjustment, cleaning, lubricants and maintenance of electrical and mechanical parts.

Troubleshooting

- a. General Troubleshooting Procedure
- b. Troubleshooting due to Power Supply
- c. Troubleshooting due to Pickup Unit
- d. Troubleshooting due to Carriage Motor
- e. Troubleshooting due to Feed Motor
- f. Troubleshooting due to Spindle Motor
- g. Troubleshooting due to Sensors
- h. Troubleshooting due to Tracking Servo
- i. Troubleshooting due to Carriage Servo
- j. Troubleshooting due to Spindle Servo

4. Video Display Unit & Colour Theory

TV theory concept, classification of picture tube, type of input, resolution, persistence, type of scanning (of both analog and Digital monitors).

Block diagram of Monochrome monitor, study of power supply scanning and sync and video output sections. Overview of ICs used, common faults and its rectification, adjustment size, brightness focus etc.

State the need for vertical synchronization, horizontal synchronization, blanking pulses, front porch, back porch and equalizing pulses.

Block diagram of colour monitor, colour picture tube, common faults and its rectification.

Colour theory: - Composite video signal TV picture and its properties, such as aspect ratio, resolution, brightness, contrast, and bandwidth, explain the main characteristics of human eye with regard to perception of colours. Distinguish between additive and subtractive mixing of colours. Explain complementary colours, hue, and saturation and colour circle.

Study of multisync VGA & super VGA monitor, specifications of VGA, Study of Flat screen, TFT, Touch Screen, LCD Screen.

5. Advanced TV Technology Systems

Video Projectors, Plasma TV, LCD TV, Calendar TV, Long persistence TV, PIP TV's, FST, Cable TV using internet, Surround sound in TV, HDTV, LCD, DLP projectors and Projection TV

PRACTICAL - III - Computer and Multi Media Audio and Video Systems

PART A - Computer and Multi Media

- 1) To study different parts of computers.
- 2) To study different Internal DOS commands.
- 3) To study different External DOS commands.
- 4) To study create, rename, copy and paste in window operating system.
- 5) To study word pad, note pad, and paint in window operating system.
- 6) To study adding new hardware and installing drivers.
- 7) To study Installation of operating systems.
- 8) To study Installation of application software's.
- 8) To study the different cards.
- 9) To study different types of Media players and their Installation.
- 10) To study the different recording systems.

- 11) To study the picture mixing using computer.
- 12) To study the sound mixing using computer.
- 13) To study the different animation effect.
- 14) To study Formatting and create partition for Hard disk.
- 15) To study Installation of Antivirus software.

RECOMMENDED BOOKS

- 1) PC Made simple
- 2) PC Upgrading & Maintenance
- 3) IBM PC Clones (II edition)
- 4) PC Magazine
- 5) Modern All About Floppy drive

Subhash Mehta
BPB
Govindrajalu

Lotia / Nair

Audio and Video Systems

1. Front panel of Tape recorder / Two in one.
2. Study of Tape mechanism.
3. Fault finding in tape recorder (Six faults).
4. Front panel of PA system.
5. Assembly of Cross over network and prepare loud speaker enclosure.
6. Study of role of equalizer circuit in an amplifier.
7. Study stereo amplifier.
8. Study front panel control of CD / VCD / DVD player.
9. Study CD / VCD / DVD player mechanism.
10. Demonstration of replacement of CD / VCD / DVD player Lens.
11. Fault finding in CD / VCD / DVD player. (Eight faults).
12. Installation of Home Theater.
13. Physical Layout & Testing of Colour of Colour Monitor.
14. Installation of Vga./ Svcga Monitor.
15. Testing Monitor Using Software.
16. Simple Fault Detection & Rectification of colour Monitor.
17. Testing & Simple faults in Keyboards.
18. Study of CD ROM Drive and DVD Drive.
19. Study of Modem (Internal / External).
20. Study of Scanner & /Web Camera.

RECOMMENDED BOOKS

1. Fundamental of Electrical Engg. & Electronics by B.L. Theraja.
2. Tape Recorder Servicing by R.C.Vijay
3. Basic Radio Vol. I,II & V. by Marvin Tapper
4. Modern CD Player. BPB
5. Modern All About Monitors Lotia / Nair

List of Materials and Instruments:

Sr. No.	Name of the equipment with Specifications	Quantity
1	Combination Pliers 15 Cms insulated	10
2	Long nose insulated pliers 15 Cms	10
3	Side cutter 15 Cms	10
4	End Cutting nipper insulated 15 Cms	10
5	Tweezers 10 Cms	10
6	Neon glow tester	10
7	Screw driver set of 6	10
8	Watch maker screw	05
9	Allen Key	01
10	Drill beat set	01
11	Hacksaw 20-25cm (adjustable)	01
12	Junior saw 20cm	01
13	File flat 20cm 2nd cut	01
14	Soldering iron 25 Watt	10
15	Temperature controlled soldering station 15 Watt	01
16	De-soldering pump	10

17	Wire gauge set	01
18	Tweezers 10 Cms	10
19	Adjustable spanner/slide wrench (15-20cm)	01
20	Wire stripper	10
21	Electric drill machine 10mm	01
22	Digital multimeter	10
23	Analog multimeter	10
24	Voltmeters 0-1V / 0-10V / 0-50V / 0-100V	02 Each
25	Ammeters 0-10 mA / 0-100 mA / 0-500 mA / 0 – 1 A	02 Each
26	Watt meter 5/250V	01
27	Regulated power supply 30V/1A	10
28	Oscilloscopes 20 MHZ	04
29	Digital Storage CRO	01
30	Digital frequency counters / Meters	02
31	Function Generator	01
32	Digital LCR meters	02
33	Digital trainers	02
34	Digital IC Tester	01
35	Logic Probes	05
36	Audio tapes	10
37	CD / DVD Video & Audio	10
38	Dimmer stat, 2 Amps	02
39	Servo Motor	01
40	DC Motor	02
41	Tachometer	01
42	Different types of displays	02 each
43	Work table/Bench	01
44	Tape recorders OR Two-in-one	10
45	Public Address Amplifiers 100W	01
46	Column loud speakers	02
47	CD / VCD Player	05
48	DVD Player	05
49	Pentium V Multimedia Computer	02
50	5.1 Home theater system	01
51	LCD Projector	01
52	Video Projector	01
53	Scanner	01
