

ELECTRONICS CURRICULUM

CLASS- XII

PAPER – I

CONSUMER ELECTRONICS

1.) Microphones and Loudspeakers

- Construction, working principle and frequency response of Carbon Microphone, Variable Reactance Microphone, Capacitance Microphone, Piezo-Electric Microphone, Moving Coil Microphone.
- Frequency ranges of musical instruments, Intensity and Dynamic Range, Constructions and working principles of Moving Coil Loudspeaker, Impedance and Power Level of loudspeaker, Frequency characteristics of Practical Loudspeakers: Woofer, Tweeter, Squawker, and Loudspeaker Enclosure.

2.) Recorders

- Analog and digital sound recording, Disk recording and reproduction, working with block diagram of disk recording and reproduction
- Principle of magnetic recording and playback, Requirement of bias, Working principle with block diagram of a tape recorder system
- Principle of optical recording, CD manufacturing and recording, CD playing system, Advantages/ Disadvantages

3.) TV System

- Working principle with block diagram of TV transmitter and receiver, Brief description with circuit diagram: TV Tuner, Video IF stage, Sound stage, Picture tube & its associated circuit, Synchronizing circuits, Horizontal & vertical deflection circuits, Remote control of a TV receiver, Idea of bandwidth, blanking and synchronization pulses, modulation scheme, monochrome system, extension of colour transmission
- Channel and cable type TV system, Head end processor, Trunk & cable distribution system with block diagram, Scrambling.
- Introduction to LCD and LED TV systems, Introduction to high definition systems

4.) Modern Appliances

- Working principle and block diagram of following:
Microwave oven, Video games, Telephone, Refrigerators, Air conditioners, Washing machine, Digital calculators, Thermometers, Fax machine, Xerox, Printers, Scanners etc.

5.) Medical Instrumentation

- Working principle and block diagram: PH, PO₂, PCO₂, PHCO₃, Electrophoresis, colorimeter, photometer, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Glucometer, Blood pressure instrument

6.) Basic Occupational Safety and Precautions

Practical:

1. Study working, assembly & fault finding of Colour TV.
2. Study working, assembly & fault finding of LCD TV.
3. Study working, assembly & fault finding of LED TV.
4. Study working, assembly & fault finding of CD/DVD playing system.
5. Study working, assembly & fault finding of Printer/ Scanner.
6. Study working, assembly & fault finding of Microwave oven.
7. Study working, assembly & fault finding of Telephone.
8. Study working, assembly & fault finding of Blood pressure instrument.
9. Study working, assembly & fault finding of Glucometer.

PAPER –II

OPERATION AND MAINTENANCE OF COMMUNICATION DEVICES

1.) Introduction to Communication System

- Information signals, Elements of communication system, Transmitters and Receivers, Bandwidth of signals, Propagation of electromagnetic waves in the atmosphere, Sky and space wave propagation
- Noise, Classification of noise, Source and description of noise
- Fundamentals of Analog and Digital communication, Digital data transmission
- Need for modulation, Production and detection of an amplitude-modulated wave, Phase and Frequency modulation, pulse modulation elements of hardware
- Introduction to Wireless communication, Basics of mobile communications, A simple reference model, Mobile and Wireless devices
- Frequencies for Radio Transmission, Regulations act, Direct Sequence Spread Spectrum , Frequency Hopping spread spectrum

2.) Cellular Systems

- Basics of cellular system, Elements of cellular radio systems, Performance criteria
- Introduction to co-channel interference, Concept of Frequency reuse, Uniqueness of mobile radio environment
- Introduction to radio propagation, Obtaining mobile point to point mode, Near distance and long distance propagation, Antenna, Its types and Applications, Antenna heights and signal coverage, Mobile to mobile propagation, Mobile antennas

3.) Satellite Communications

- Introduction and brief history of satellite communication, Overview of Satellite system
- Satellite frequency bands, Introduction to telemetry tracking and command, Satellite mobile communication, Introduction to C/N ratio and S/N ratio, Introduction to VSAT technology

4.) Mobile Technology

- History of Mobile technology, Generation of mobile phones
- Basics of TDMA, FDMA, CDMA and GSM, GSM and CDMA Architecture, Services, Overview of Mobile phone components
- Bluetooth, Infrared, GPRS, DECT, UMTS, IMT-2000, Wi-Fi, SIM, IMEI

- Base and Maser system, Various value added services, Mobile IP, Location updates and paging, Security, Authentication/ Encryption
- Overview of wireless LAN, Advantages/Disadvantages, Roaming

5.) Mobile Hardware And Software

- Introduction to hardware and their faults, Basic circuit board configuration, Identification and Working of different BGA IC's, working on SMD and PCB's
- Introduction to software and their faults, Introduction of various boxes, flashing of various brands, formatting of virus affected mobiles, Removing software problems by codes, unlocking of mobile phones using codes and software, Unlocking codes for GSM & CDMA

6.) Support Program

- How to open and manage your own mobile repair shop.
- How to successfully work as a technician.
- Where to procure tools, spare parts and accessories.
- How to deal with customers and distributors.
- Technical support guidance

PRACTICAL

- 1.) Assembling & disassembling of different types of mobile phones.
- 2.) Use of various tools & instruments used in mobile phone repairing.
- 3.) Study of basic parts of mobile phones (mic, speaker, vibrator, LCD, antenna, etc) And Testing of various parts with multi-meter.
- 4.) Recognize different IC's and study their working.
- 5.) Soldering and De-soldering of different BGA IC's using soldering iron.
- 6.) Practice of changing Driver IC Jumper.
- 7.) Practice of changing Display in mobiles.
- 8.) Practice of changing various jacks in mobile phones.
- 9.) Practice of changing Bluetooth module.
- 10.) Cool testing and hot testing of mobile phones for fault finding.