

ELECTRONIC FACULTY

COURSES & SYLLABII



INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

Implemented From Nov. 2014

INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

CERTIFICATE COURSE

Multi Skill Technician (MST)

OBJECTIVES

The training should be focused so as the candidate can work mainly as demo technician & partly as technician involving elementary problems only (particularly AC or Dc supply problems, dismantling or assembling a TV chassis or subassembly board or mechanical problems like door problem of a refrigerator etc.). But the candidate must be able to handle various products like TVs (LCD), DVD players, music systems, DTH systems, mixers, food processors, microwave ovens, refrigerators & air conditioners.

SCHEME OF EXAM:

THEORY	:	No theory paper.	
PRACTICAL	:	3 hours, 200 marks	
	:	One practical exam on installation of anyone	50 marks
	:	Fault finding of any two appliances/ devices mentioned	100 marks.
	:	Oral:	50 marks
			Total: 200 marks.

Part I: Electrical

1. Basic electricity: current, voltage, resistance & their units. Power, Energy. Consumption of electricity, power rating of a device. Series, parallel circuits Use of meters for measurements.
2. Types of supplies - DC & AC. Values, frequency, phase. Properties of coil & capacitor when connected to DC & AC Supplies. Power consumption, power factor.
3. Study & testing of electrical components, wires, fuses, switches, resistors, capacitors, over load release, relays, neon lamps etc,
4. Use of neon tester, test lamp, multi meters
5. Study of different types of motors, their features & applications. Study of transformers.
6. Study of electrical appliances – Electric iron, Mixers, food processor, toasters, geysers, boilers. Study of Washing Machine. Types. Common problems. Installation.

Part II: Electronics

1. Study of components-Resistors, capacitors, coils, transformer, loudspeakers, diodes, transistors ICs., types of wires, switches, relays, fuses , connectors, various types of cables, jacks & sockets. Their specifications & testing.
2. Study of Semiconductor devices - Diodes, transistors, FET, UJT, SCR, MOSFET, CMOS etc. Study of ICs.

3. Study of Power supply circuits: Rectifiers, filters. Study of various power supply circuits & its testing, fault finding. Voltage regulators. Study of SMPS.
4. Study of transistor circuits, amplifiers, coupling of amplifiers, voltage & power amplifiers. (Transistorized & IC circuits) Oscillators.
5. Brief idea of radio communication. AM, FM modulation. Frequency bands. Use of a radio, memorizing selected radio station.
6. Study of audio systems. Mono & stereo amplifiers, connections of input & output. Speaker types & connections & installation. (5.1 system), connections to pc. Various forms of recording sound signal on digital format like wave, mp3 etc. USB connection. DVD/CD players. Installation, Connections
7. TV basics. Identification of stages, common faults & their remedies, study of menu / functions. (Tuning, timer, systems, channel skip, blue back, curtain etc.). Connections of AV in & out for recording/playback of a DVD player, installation of DTH. CCTV connections. Connections of S video, component video, optical & hdmi.
8. Introduction to microwave oven, types. Different stages. Common problems & their remedies.

Part III: Refrigerator & Air conditioner:

1. Study of basic operation of a refrigerator.
2. Basic Refrigerator. Study of its parts & their function & testing. Common problems.
3. Study of air conditioner, Study of its parts & their function & testing. Common problems. Installation of ac – window & split type.
4. Study of water coolers, bottle coolers etc. Common problems.

Soft Skills:

[As this technician has to deal with the customers, his language & mannerism is most important. So, the teachers should give more attention accordingly.]

Recommended Books:

1. Basic Radio & Television :S.P.Sharma.
2. T.V. servicing: K.C. Agarwal.
3. Colour T.V. Servicing manuals: K.C. Agarwal
4. Cd /DVD servicing manual: Manohar Lotia.
5. Basic Electrical Engg. :P.P.Shah.
6. Elementary Electrical Engg. : M.L.Gupta
7. Refrigeration & AC Servicing: S.Kumar
8. User & service manuals of CTVS, LCD TVS, DVD players, microwave ovens, washing machines, & refrigerators & air conditioners of various leading brands.

INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

CERTIFICATE COURSE AUDIO RADIO SERVICING [ARS]

EXAM SCHEME: THEORY PAPER 100 MARKS – 3 HRS.
PRACTICAL 100 MARKS – 2 HRS.

[ARS / DEES (ER) – I / DETES - I]

THEORY SYLLABUS

1) BASIC ELECTRONICS: -

- a) Concept of AC & DC.
- b) AC Theory: Peak to Peak, RMS and Average value. Phase and Wavelength. Power factors derivation for XL, XC (study of mathematical formulas, no calculations required)
- c) Concept of open and short circuit.
- d) OHM's Law, Current, Voltage and Resistance relations, Power unit, Power consumption, Simple calculations.

2) ELECTRONIC COMPONENTS & SYMBOLS: -

A) Resistors: -

- a) Types of resistors & their ratings: -
Fixed Value: - Carbon, Metal Film, Wire Wound.
Variable: - Carbon, Wire Wound (LOG & LINEAR Controls)
- b) Colour code: - Fixed as well as Preset colour code values.
- c) Testing of resistors.
- d) Use of resistors.
- e) Series & Parallel connection of resistors. Simple calculations for series, parallel & series-parallel Combination.
- f) Special types of resistors (Symbols, functions & use only) PTC & NTC
Thermister, Fusible Resistor, LDR, VDR.

B) Condenser / Capacitor: -

- a) Types of Capacitor & function: -
Fixed Value: - Paper , Polyester, Ceramic, Mica, Styroflex, Tantalum Etc.
Semi variable: - Trimmer. Variable: - Ganged
Electrolytic capacitors.
- b) Colour code: - Values, Working Voltage, Tolerance and Temperature coefficient of Electrostatic capacitors.
- c) Number code system.
- d) Testing of capacitors.
- e) Use of capacitors.
- f) Series & Parallel combination of capacitors.

C) Inductors & Transformers: -

- a) Definition of self-inductance & mutual inductance.
- b) Types of Transformers and their uses.
- c) Testing of Transformer & their uses.

D) Loudspeakers & Microphones: -

- a) Working principle of a loudspeaker.
- b) Construction of a P.M. loudspeaker.
- c) Woofers, Midrange / Squawkers and Tweeters.
- d) Specification of loudspeaker. (Impedance & Power rating)
- e) Testing of loudspeaker.
- f) Cross over networks.
- g) Different types of microphones and its construction. (Condenser, Crystal & Dynamic microphones)

E) Semiconductors: -

- a) Electrical properties of conductors, semiconductors and insulators.
- b) Semiconductor:
Definition: metals suitable for formation of P-type semiconductor and formation of N-type semiconductor, Types of impurities used for doping N-type and P-type semiconductor. Majority and minority charge carriers.
 - 1] Diode:
 - 1. Junction diode, Point contact diode, Zener diode, Light emitting diode. Symbol's used for diode.
 - 2. Forward & Reverse characteristic and properties of diode. Zener diode reverse characteristic only.
 - 2] Transistor :
 - 3. Types of Transistor: - NPN, PNP. Germanium and silicon. Testing of transistor with help of multi-meter.
 - 3] Integrated circuits (ICs).
 - 4. Introduction, Types of ICs, Merits and Demerits of ICs.

3) POWER SUPPLY: -

- a) Working of a Half wave, Full wave and Bridge rectifier.
- b) Regulated power supply employing: -
 - 1) Zener diode, 2) Series pass Transistor, 3) ICs of 78 -- & 79 -- Series.
- c) Simple RC filter circuit.

4) BASICS OF TRANSISTOR CIRCUITS: -

- A) **Biasing of transistor: -**
Different types of biasing circuits used to bias the transistor. (Fix bias, Potential divider bias, Self bias, Temperature compensated bias) Merits and Demerits of bias circuits.
Thermal run-away of transistor. Working of heat sink.
- a) **Classes of amplifier: -**
Study and use of class A amplifier, Class B amplifier and Class C amplifier.

- b) **Configuration of amplifier: -**
Study of common base amplifier, common emitter amplifier and common collector amplifier.
Definition of Alpha (α) and Beta (β).
- c) Study of single stage voltage / current amplifier.
- d) **Types of signal couplings methods: -**
R-C coupling, L-C coupling, transformer coupling and direct coupling circuits used in transistor amplifier. Merits and demerits of each coupling circuit. Definition of Gain and Bandwidth.
- e) **Signal feedback in the amplifier :-**
Need of signal feed back, +ve feed back & -ve feed back. Their effects on the working of the amplifier.

5) AUDIO AMPLIFIER: -

- a) Single Transformer & Transformer less push-pull out-put amplifier.
- b) Driver and pre amplifier circuits (Full audio amplifier circuit).
- c) Stereo amplifier circuits. (Discrete components and IC circuits).
- d) Intercom circuits and its servicing (one master & two slave).
- e) Simple audio tape recorder circuits.
(Head pre amplifier and main amplifier with record - play back switch).
- f) P.A. system (Block diagram).
- g) IC audio amplifier circuit employing ICs: TBA 810, etc.

6) AUDIO EQUIPMENT: -

- a) Principle of magnetic recording. Eddy current and Hysteresis losses.
Magnetic tape, Tape coating material.
- b) **Audio Heads: -** Working principle and construction of audio heads. Importance of head gap, Alignment & cores of Audio.
- c) **Tape Mechanism: -** Study of different tape recorders & tape deck mechanisms.
- d) **CD Player: -**
 - 1) Block diagram of audio CD player.
 - 2) Working of CD player mechanism.
 - 3) Merits & demerits of CD.
 - 4) Fault finding in CD player.

7) OSCILLATORS: -

Principle of oscillators. L-C oscillator, Hartley & Colpitt oscillators.

8) CONCEPT OF MODULATION / TRANSMISSION: -

- a) Amplitude modulation (AM).
- b) Frequency modulation (FM).
- c) Block diagram of AM and FM transmitter.
- d) Pulse modulation (PM).
- e) Wave propagation (DSB, SSB).

9) SUPERHETERODYNE RECEIVER: -

- a) Block diagram of super heterodyne (AM, FM mono/stereo & AM/FM) receiver with waveform.
- b) Converter stage amplifier (Single band & Multi band).
- c) Antenna (Ferrite, Loop & Telescope).

- d) I.F. amplifier basic circuit.
- e) Detector circuit, RF filters circuit.
- f) AGC/AVC circuit.
- g) Study of the equipment used in IF and RF alignment procedure.
- h) Alignment procedure of IF and RF circuit.
- i) Study of AM/FM receiver.
- j) Advantages and disadvantages of FM receiver.
- k) Study of FM mike.

10) FAULT FINDING PROCEDURE: -

Study of various test to locate the fault in given Tape recorder and Transistor receiver circuit.

GUIDELINES FOR QUESTION PAPER SETTERS

- | | | |
|--------------|--|---------------|
| Q. no.1 | Compulsory (Objective type). | 20 marks |
| Q. no.2 to 8 | Solve any five questions from Q. 2 to 8 (Subjective type). | 16 marks each |

The paper setter should take care that (as far as possible) entire syllabus is equally covered.

PRACTICAL EXAMINATION FOR: - ARS / DEES (ER) – I / DETES – I

Each candidate will have to locate three faults out of which one must be in audio equipments & two faults from radio receiver. Each fault will give 08 marks to locate fault and draw the circuits. 12 mark for write up. The write up indicate the logical method of located faults.

- | | |
|---|-----------|
| Journal / Term work | 20 Marks. |
| (Journal should contain minimum 50 recommended experiments) | |
| Oral examination | 20 Marks. |

RECOMMENDED BOOKS FOR REFERENCE

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|---|---------------|
| Basic Radio & Television | S.P. Sharma. |
| Fundamental of Electrical Engg. & Electronics | B.L. Theraja. |
| Servicing Transistor Radio | |
| Tape Recorder Servicing | R.C.Vijay |
| Basic Radio Vol. I,II & V. | Marvin Tapper |
| Modern CD Player | BPB |



INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

CERTIFICATE COURSE

Television Servicing (TVS)

1. Principles of Monochrome Television and Picture Transmission:

Picture elements. Video frequency spectrum, Motion picture. Persistence of vision, flicker. Picture brightness, contrast, Aspect ratio, viewing angle. Raster formation, resolution, scanning, interlace scanning, CCIR B standard, Line frequency, Frame frequency. Need of H & V synchronization with respect to picture. Advantages Positive and Negative modulation. Composite Video signal (CVS). Need of H & V blanking, vestigial side band transmission. Block diagram of Monochrome transmitter.

2. Principles of Colour and colour transmission:

Colour fundamentals, Visible spectrum of electromagnetic waves. Colour Mixing - 1) Subtractive mixing. 2) Additive mixing. Chrominance signal response of human eye. Concepts of Luminance, Hue & Saturation. Luminance signal/ Chrominance signal. Different Transmitting systems of colour TV signal. 1) PAL 2) NTSC 3) SECAM PAL encoder block diagram. Frequency interleaving, choice of colour subcarrier. Quadrature modulation. Composite colour video signal (CCVS), Subcarrier suppression. Luminance & Chrominance Delay line. PAL decoder block diagram. Block diagram of colour tv.

3. Antenna & Tuner:

Simple indoor and outdoor antenna. Installation of antenna, reflectors and Directors, Transmission line, co axial cable, Balloon transformer, Booster amplifier. Basic single channel TV tuner (RF amplifier, Local oscillator & mixer). [Block level] VHF/UHF multi channel tuner. [Block level] Electronic tuner, programme selector circuits, Fine tuning, Automatic fine tuning (AFT)

4. Vision I.F. Amplifier(V.I.F.)/ Video detector:

Study of I.F. band-pass frequency, staggered tuning. SAW filter, Coupling circuits. Monochrome I.F. response. Gain control circuit. Simple A.G.C., Delayed A.G.C., A.G.C. amplifier. Diode detector and synchronous detector. IC CA 3068, TDA 3540/3541, uPC 1366 circuits. Study of I.F. band pass frequency, staggered tuning. SAW filter, coupling circuits, IF response, Gain control circuit. Noise cancelling circuit. AFT circuit. IC- TA 7680,

5. Video Amplifier:

Video frequency response/ Frequency compensation methods & types of coupling. D.C. restoration circuit. Video amplifier gain control (contrast) circuits. Blanking circuits. Colour Demodulator Circuit: Chroma band pass amplifier. Burst Gate amplifier, Sand Castle pulses. Burst blanking. Automatic colour control circuit. Colour Killer circuit. Colour subcarrier generator / Automatic Frequency & Phase Control (AFPC). Ident pulse generator. PAL line driver / PAL delay line. PAL switch. Colour demodulator. RGB matrix. RGB video amplifier. Colour PAL decoder IC circuit. TA 7698.

6. Picture tube:

Basic construction of B/W picture tube, electronic gun, TV screen, Function of electronic gun, Electrodes. Focusing & Deflection: Electrostatic/Electromagnetic type.

Contrast problem, ion burn problem, & their solution. Aluminized screen. Protection of picture tube: Flash over, Implosion, Screen burn. Picture tube numbers. Picture tube electronic circuit. Geometrical distortion in raster.

Colour Picture Tube:

Colour picture tube: Shadow mask tube, Trinitron tube, Inline picture tube. Automatic degaussing circuit. Gray scale, Purity convergence & pincushion adjustment. Picture tube electronic circuit. Picture tube numbers. Precautionary measures at the time of replacement & installation of picture tube.

7. Scanning circuits:

e) Synchronization: Need of synchronization. Sync separator circuit- Basic circuit, Integrator & Differentiator circuit. Transistorized sync circuit. Need of Automatic Frequency Correction circuit. Anti hunt network.

f) Horizontal & Vertical circuits:

Horizontal: Different horizontal oscillator & automatic frequency correction.(AFC).

Horizontal drivers and output circuits. EHT voltage stability & effect on picture.

Auxiliary low voltage power supply.

Vertical: Different vertical oscillators, driver & output circuits. Function and working of a Height control, Vertical Hold & Vertical Linearity control.

8. Sound:

Study of sound I.F., sound detector circuits. IC's used for sound I.F. and audio amplifier. Mute circuit. study of IC circuits- TDA 1190, μ PC 1353, CA 3065, TBA 120 S.

9. Power Supply:

Requirements of power supply for TV. Simple low voltage power supply.

Transistorized regulated power supply. Switch mode power supply. STR power supply.

Advantages & disadvantages of SMPS & STR power supply.

10. Remote Control:

Principle of working. Pulse modulation (PPM encoding) Infra red transmitter & receiver.

Block diagram of remote control. (Transmitter & receiver.) Types of remotes.

Testing of remote control.

11. Advanced Displays & TVs.

Introduction of flat screens- TFT, LCD, LED & Plasma. Resolution. Introduction to pc monitors, & TV receivers.

12. Servicing Tools & Equipments:

Study & use of following test equipments as well as their front panel controls.

1. DMM 2. Cathode ray oscilloscope 3. Marker Generator 4. Wobulloscope.

13. Trouble Shooting Technique:

Preliminary tests. Precaution taken at the time of TV servicing. Systematic fault finding procedure for the common faults.

Practicals:

1. Front Panel Layout of a 20" & 14" B/W T.V.
2. Chassis layout of a 20" & 14" B/W T.V.
3. Identification of stages in a B/W T. V
4. Study and use of special components used in T.V & their testing (H. Driver transformer, H. Lin. coil, EHT transformer, Spark gap, yoke, ceramic filter, SAW filter, balloon, EHT rectifier, antenna connection, CRT filament, Mains transformer)
5. Data of ICs used in TV
6. Tracing of power supply stage
7. Testing of power supply stage.
8. Tracing of AF amp & o/p
9. Tracing of SIF amp FM detector.
10. Tracing of sync sep , AFC, H.osc
11. Tracing of H driver, O/p, EHT transformer.
12. Tracing of vertical stage
13. Tracing of video stage & crt circuits
14. Tracing of VIF stage , v.det, agc
15. Layout of a Tuner , VIF box
16. DC & AC (by using ac probe) voltage measurement of a 20" & 14" TV
17. Testing of EHT Rectifier
18. Study of yagi antenna and its installation
19. Study of a front panel of a colour TV.
20. Study & testing of special components :(Degaussing coil, crystal, PAL delay line, balloon, H. Driver transformer, H. Lin.coil, EHT transformer, yoke, ceramic filter,
21. Study of picture tube & yoke.(pin configuration, ratings etc.)
22. Chassis layout of a colour TV.
23. Study & tracing of SMPS.
24. Testing of SMPS
25. Tracing of horizontal stage.
26. Tracing of vertical stage
27. Tracing of RGB output stage
28. Study of band changing technique
29. Study of AV in/out, AV switching
30. Voltage measurement of a CTV
31. Study of Int. Degaussing coil circuit
32. Use of Ext.degaussing coil
33. Study & use of a colour pattern generator
34. Use of a colour pattern generator to set a raster.
35. Study & use of a CRO
36. Study of waveforms at different test points
37. Connections of CD/DVD player & VCR for recording
38. Installation of dish antenna.
39. Setting of purity, convergence & white balance
40. Connections of LCD tv & DVD player using S video / Component video inputs.

Note:

1.Three faults are to be given in a practical exam. One fault must be either in power supply stage, SMPS. Or in a horizontal stage. Second fault in video stage of a colour TV & third fault in tuner/ VIF amp.AGC/ Sync/ SIF stages.

GUIDELINES FOR QUESTION PAPER SETTERS

Q. no.1 Compulsory (Objective type).

20 marks

Q. no.2 to 8 Solve any five questions from Q. 2 to 8 (Subjective type). 16 marks each

The paper setter should take care that (as far as possible) entire syllabus is equally covered.

Recommended Books:

1. Monochrome & colour TV servicing: R.C.Gulati.
2. Colour TV Servicing : R.C.Gulati
3. Television Engineering by Arvind Dhake.
4. Service manuals & circuit diagrams of commercial TVs.

INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

CERTIFICATE COURSE MOBILE SERVICING [MS]

**EXAM SCHEME: THEORY PAPER 100 MARKS – 3 HRS.
 PRACTICAL 100 MARKS – 2 HRS.**

THEORY SYLLABUS

1) INTRODUCTION TO BASIC ELECTRONICS.

- a) Types of Materials viz. Insulator, Conductor, Semiconductor etc.
- b) Concept of AC & DC voltage & current, Power, Ohms Law & Mobile Battery & Charger.
- c) Resistor, Capacitor, Transformer,
- d) Diode, Transistors, ICs (LSI, VLSI), LED & LCD Display etc.

2) INTRODUCTION TO DIGITAL ELECTRONICS.

- a) Binary system (Different number Systems, Decimal, Binary, Hexadecimal, Conversion of one No. system to another No. system.
- b) Logic gates (AND, NAND, OR, NOR & NOT)
- c) Types of Memory (ROM, PROM, EPROM, EEPROM, DRAM, SRAM, VRAM, Cache Memory, Primary, Secondary Memory etc.)

3) INTRODUCTION TO COMPUTER SYSTEM.

- a) Modulation, Demodulation, Modem working & types, Digital communication (transmissions & Receivers). Mobile TV signals.
- b) DOS, Windows operating systems (Hardware, Software, Desktop settings, Specialized software).
- c) Internet Browsing (E-mail, searching information on the internet, Downloading information, files, software & Drivers.

4) INTRODUCTION TO BASIC TELEPHONE SYSTEM.

- a) Working of Landline Telephone system & Mobile Telephone.
- b) Cells of network, Antennas, Grid or cells, Range of operation of Mobile phone, Network of Mobile connectivity
- c) Different Mobile Operators (Vodaphone, Airtel, BPL etc.)
- d) SIM card (Storage capacity, Lock/unlock SIM card.

5) OPERATION AND INTRODUCTION TO MOBILE HANDSET.

- a) Different Mobile Models: - 3310, 6110, 6600, Nokia, Tata Indicom & LG.
- b) Difference between WLL & GSM Technology.
- c) Introduction to CDMA Technology.
- d) Function of Different menus available in Mobile Hand set
- e) Receiving & sending SMS / MMS
- f) Internet cables, GPRS, WLL, and Software for Internet.

6) COMMON FAULT IN MOBILE HAND SET.

- a) Disassembly of cell phone, Hand set circuit Analysis and Troubleshooting, common fault symptoms,
- b) Troubleshooting on hardware problems
- c) Phone is totally dead, Virus, Flash Programming doesn't work, Power doesn't stay on or phone is jammed.
Display information – Contact service, Audio failure, Charger Failure, Receiver Faults, and Transmitter Faults.

7) INTRODUCTION TO FUTURE OF MOBILE PHONE.

WAP, GPRS, Blue Tooth, PDA, Palm Tops, Hands held PCS with Phone.

8) EQUIPMENTS.

Soldering Iron, Soldering Stations, Hot air gun, Wave solder, Digital Multi meter, Oscilloscope, Logic Probe, Memory Card reader, Different wires / Interfaces, Hands free kit & car charger.

9) Data Connectivity

Dual SIM handsets, Smart phones. Data back up. Installation of new applications & games. GPRS set up. PC suits. PC synchronization. Data transfer. Blue tooth, Wi-Fi & infra red connectivity.

10) Introduction to Smart phones

Android & Windows operating system. Up gradation of system

GUIDELINES FOR QUESTION PAPER SETTERS

Q. no.1	Compulsory (Objective type - covering entire syllabus.)	20 marks
Q. no.2 to 8	Solve any five questions from Q. 2 to 8 (Subjective type)	16 marks each

No question shall be asked to draw circuit diagram but faults can be asked on given circuit diagram

PRACTICAL EXAMINATION FOR: - MOBILE SERVICING (MS)

Each candidate will have to perform three Faults. Two faults in Hardware section and performing one Experiment on Software section (Installation/up gradation of Mobile Handset). Each faults & Installation will give 8 Marks & 12 Marks each for writing procedure.

Journal / Term work	20 Marks.
(Journal should contain minimum 25 recommended experiments)	
Oral examination	20 Marks.

RECOMMENDED BOOKS FOR REFERENCE

Mobile Phone
Mobile Phone
Mobile Communication
Mobile Communication
Digital Principles and application

Agashe.
Lotia.
C. Y. Lee.
Mzda.
Malvino& Leach.



INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

CERTIFICATE COURSE DIGITAL ELECTRONICS & MICROPROCESSOR [DEM]

EXAM SCHEME: THEORY PAPER 100 MARKS – 3 HRS.
 PRACTICAL 100 MARKS – 2 HRS.

[DEM / DCHES - I / DCNES – I]

THEORY SYLLABUS

1) BASIC ELECTRONICS: -

A) BASIC ELECTRONICS: -

- a) Concept of open & short circuit.
- b) Ohm's law, current, voltage & Resistance relation, Power unit Power consumption.
- c) Soldering & de-soldering Technique.

B) ELECTRONIC COMPONENTS: -

Component's: - Resistor, capacitor, inductor, Transformer.

- 1) Types 2) Values (by colour code, Number system) 3) Testing
- 4) Use's

C) SEMICONDUCTOR: -

- a) Electric properties of conductor, Semi-conductor & Insulator.
- b) Definition of Semi-conductor.
Suitable material for formation of P-Type & N-Type Semi-conductor. Impurities of P-Type & N-Type material.
- c) Diode
Junction Diode, Zener Diode, Light Emitted Diode, photo Diode
1) Types 2) Number System 3) Testing 4) Uses.
- d) Transistor Types: -NPN & PNP ,Germanium & Silicon. Testing of Transistor using Multimeter.
- e) Integrated circuit (IC's)
Introduction, Types of IC's, Merit & De-merit of IC's.

2) BASIC OF TRANSISTOR CIRCUIT: -

- a) Biasing of Transistor.
Fixed bias, Potential divider bias, Self bias.
What is Thermal run-away of transistor and what is the solution on it?
- b) Class of Amplifier: - Basic circuit of class –A, class-B, class-C Amplifier.
- c) Configuration of transistor: -
Common base amplifier, common Emitter amplifier, Common collector Amplifier.
Definition of Alpha & Beta.
- d) Study of Single Stage amplifier.
- e) Types of coupling R-C, L-C, Transformer & Direct coupling circuit. Merit & De-merit of it.

3) DIGITAL ELECTRONICS: -

- a) Different number system, Study of different codes, Study of Logical Gates, Binary adder & subtractor, Demorgan's law.
- b) Study of FLIP-FLOP : SR, JK, MS-JK, D, SR-T.
- c) Counter : Binary, BCD, Mod-Nth, UP and Down, Ring counter.
- d) Registers : Serial and parallel registers. (Right/Left)
- e) A/D and D/A Converters: Basic D/A converter, Ladder and Weighted type.
Basic A/D converter, SAR, Counter ramp type.
- f) Combination network using Gates: Encoder, Decoder, Parity encoder, Parity generator, Multiplexer, De-Multiplexer.
- g) Semiconductor Memory : RAM, ROM, PROM, EPROM, EEPROM, Static and dynamic memory.
- h) Flash memory.

4) MICROPROCESSORS: -

- a) Introduction to 8085 Microprocessor, Block diagram of 8085 Microprocessor.
- b) 8085 Microprocessors system organization & its Terminology.
- c) Block diagram of 8085 kit., Study & Interfacing of μ p kit (keyboard, LED, LCD, seven segment display)
- d) With reference to 8085 microprocessor, study the following interfacing IC's : 8150, 8251, 8253, 8259, 8279, 74244, 74245.
- e) Programming in 8085 kit.
1) Flow charts. 2) 8085 Instruction set. 3) Simple programmes as per the given practical list.

5) SWITCH MODE POWER SUPPLY (SMPS): -

- a) Basic principle of SMPS.
- b) Block diagram of AT SMPS & AT-X SMPS.
- c) Colour code of wires, different voltages and current outputs.
- d) Introduction to UPS, Block diagram, Installation.

6) KEYBOARD AND MOUSE: -

- a) Types of Key's
- b) Type's of Keyboard's
- c) Testing of Keyboard using KBD utility.
- d) Types of Mouse and its internal physical layout.
Interconnection of PC-5pin keyboard socket, PS-2 keyboard, 9/15 pin Serial Mouse, PS-2 Mouse.

7) ELECTRONIC DISPLAY: -

Seven Segment LED / LCD Display, Gas discharge display.

8) TEST INSTRUMENTS: -

Application & use of Oscilloscope, DMM, Frequency meter, logic probe, Logic analyzer, Block diagram of Digital voltmeter, Digital frequency meter, Digital clock.

GUIDELINES FOR QUESTION PAPER SETTERS

Q. no.1	Compulsory (Objective type - covering entire syllabus.)	20 marks
Q. no.2 to 8	Solve any five questions from Q. 2 to 8 (Subjective type)	16 marks each

PRACTICAL EXAMINATION FOR: - DEM / DCHES - I / DCNES – I

Each candidate will have to perform 2 Experiments. One Experiments based on digital Electronics, second experiments based on Microprocessor program. Performing Experiments 20 Marks each & writing procedure/program 10 Marks each.

Journal / Term work	20 Marks.
(Journal should contain minimum 25 recommended experiments)	
Oral examination	20 Marks.

RECOMMENDED BOOKS FOR REFERENCE

Digital Electronics practical devices.	Jain &Anand.
Digital principles and application	Malvino& Leach.
Microprocessor architecture programming and application	Gaonkar.
Fundamental of Electrical Engg.& Electronics	B.L. Theraja.
Digital Electronics Practice devices	Jain / Anand
Modern All About S.M.P.S.	Lotia / Nair
Intel microcomputer data book.	



INDIAN TECHNICAL EDUCATION SOCIETY MUMBAI

CERTIFICATE COURSE COMPUTER MAINTENANCE [CM]

**EXAM SCHEME: THEORY PAPER 100 MARKS – 3 HRS.
 PRACTICAL 100 MARKS – 2 HRS.**

[CM / DCHES – II / DCNES – II]

THEORY SYLLABUS

1) IBM PC – SYSTEM

- a) Block diagram of PC_ System. Different Input and Output devices.
- b) Physical layout of Mother board (Socket-7, Slot-1 and Dual)
- c) Different CPU (P-I, P-II, P-III and P-IV) advantages and disadvantages.
- d) Study of RAM used in PC.
- e) Different connectors, Cables and Sockets use in system.
- f) Study of C-MOS (Award/AMI bios)

2) F.D.D. & H.D.D.

- a) Study of FDD and HDD drive (Types Capacity, Size, etc.)
- b) Physical installation on FDD and HDD.
- c) Jumper Setting of HDD, Twisted cable of FDD.
- d) Formatting of Floppy disk.
- e) Partitioning and formatting of Hard disk.
- f) Study of different Interface (IDE, ATA, WATA, ATAPI, etc.)

3) MONITOR (VIDEO DISPLAY UNIT)

- a) Study of different video display (monitor/LCD)
- b) Block diagram of mono VGA monitor/ Colour VGA monitor.
- c) Study of different display adopter cards.
- d) Study of Resolution and its setting.
- e) Installation of Display adopter.

4) SYSTEM SOFTWARE & DIAGNOSTIC TOOLS

- a) Installation of Window. (Win 95/98) [Windows XP,7 & 8 be included]
- b) Study of Internal and External DOS Commands (Dir, Drive select, Check disk, CD, MD, RD, Copy, F disk, Format, Disk copy, Scandisk, Ver., Time, Date, etc.)
- c) Study of Viruses and antidotes : Norton, PC-Cline, etc.
- d) Study of Window (Control Panel, System Tools, Device manager, Display properties)
- e) Introduction for use of Advances diagnostics (DM, Partition Magic, Defragmentation, etc.)
- f) Study of Internet (To open E-mail account, Send and receive the E-mail)

5) CD-R/W & MODEM

- a) Study of CD-ROM and installation under DOS.
- b) Installation of CD-W under windows.
- c) Study of Modem (Internal and External).
- d) Installation of Modem.
- e) Inter connection of CD-R/W, DVD, External Modem and PC- System.
- f) Installation of DVD.

6) DIFFERENT ADON CARDS (Sound, TV Tuner, Network, DVD, Web. camera, etc.)

- a) Installation of Sound card drivers.
- b) Installation of TV Tuner card.
- c) Installation of Network Adopter.
- d) Installation of Web Camera.

7) PRINTER

- a) Types of Printer (DOT matrix, Inject, Laser Printer).
- b) Interconnection of PC and Printer.
- c) Installation of Printer in Window and DOS.
- d) Study of Printer sharing switch.

8) SCANNER

- a) Types of scanner.
- b) Study of Block diagram of scanner.
- c) Study of Installation of scanner

9) DIGNOSTIC

- a) Preventive Maintenance.
- b) Booting Problems.
- c) FDD/HDD Problems.
- d) Keyboard / Mouse Problems
- e) Printer Problems.

GUIDELINES FOR QUESTION PAPER SETTERS

Q. no.1	Compulsory (Objective type - covering entire syllabus.)	20 marks
Q. no.2 to 8	Solve any five questions from Q. 2 to 8 (Subjective type)	16 marks each

PRACTICAL EXAMINATION FOR: - CM / DCHES – II / DCNES – II

Each candidate will have to locate three faults. Two faults in system and performing one Experiment on Installation of Software/Hardware or Formatting HDD/FDD. Each faults & Installation/formatting will give 8 Marks & 12 Marks each for writing procedure.

Journal / Term work	20 Marks.
(Journal should contain minimum 30 recommended experiments)	
Oral examination	20 Marks.

RECOMMENDED BOOKS FOR REFERENCE

Modern All About S.M.P.S.	Lotia / Nair
Intel microcomputer data book.	
PC Made simple	Subhash Mehta
PC Upgrading & Maintenance	BPB
IBM PC Clones (II edition)	Govindrajalu
PC Magazine	
Modern All About Floppy drive	Lotia / Nair
Modern All About Monitors	Lotia / Nair
Digital electronics practical devices.	Jain & Anand.
Digital principles and application	Malvino & Leach.
Intel microcomputer data book.	



INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

CERTIFICATE COURSE COMPUTER NETWORKING [CCN]

EXAM SCHEME: THEORY PAPER ONLY - 100 MARKS – 3 HRS.

[CCN / DCNES – III]

THEORY SYLLABUS

1) REVISION OF SYSTEM SOFTWARE & DIAGNOSTIC TOOLS: -

- a) Installation of Window. (Win 95/98/98SE) [win XP, 7 & 8]
- b) Study of Internal and External DOS Commands (Dir, Drive select, Check disk, CD, MD, RD, Copy, Fdisk, Format, Disk copy, Scandisk, Ver., Time, Date, etc.)
- c) Study of Viruses and antidotes : Norton, PC-Clint, etc.
- d) Study of Window (Control Panel, System Tools, Device manager, Display properties)
- e) Introduction for use of Advances diagnostics (DM, Partition Magic, Defragmentation, etc.)
- f) Study of Internet (To open E-mail account, Send and receive the E-mail)

2) NETWORKING BASICS: -

- a) Networking : Introduction ,Topology ,Network components.
- b) Network Media: UTP, STP, Coaxial cable, Optical Fiber .
- c) Protocols –Definition, Types (TCP/IP PROTOCOL- advantages, Addressing)
- d) Network Architecture : Ethernet, Token Ring, Apple Talk, Arcnet .
- e) Network Access Methods.
- f) Concept of OSI Model

3) NETWORK ENVIRONMENT: -

- a) Network Operation : Server , NOS, Workstation ,Services , Applications .
- b) E-Mail Standards.
- c) Client/Server Environment.
- d) Network Management.
- e) Workgroup Environment.
- f) Network Data Security – Password, Access Control, Data Encryption ,
- g) Audition, Virus Protection, Back Up.
- h) Data Transfers Modem, PSTN, Leased lines, ISDN .
- i) Repeaters, Bridges, Routers, Brouters (Introduction).
- j) Router Protols, Gateways. WAN Types.

4) LINUX: -

- a) Linux installation – Server & Workstation.
- b) Configuration & Operation of Linux Workstation.
- c) Basic Linux commands.

5) INTRODUCTION TO WINDOWS XP, NETWORK OPERATING SYSTEM (NOS) :

- A) NOVEL NETWORK**

- B) WINDOW 2000 SERVER & WORKSTATION: -**
 - a) Installation of Window 2000 Server .
 - b) Installation of Window 2000 Workstation.
 - c) Configuration of Window 200 Environment.
 - d) Window 2000 Administration.
 - e) Application Support.
 - f) Remote Access Service .
 - g) Configuring TCP/IP network Services.

- C) INTRODUCTION TO 2003, 2008 Server.**

6) WEB TECHNOLOGY: -

- a) Installation of Web Server (Microsoft IIS 4.0 Server)
- b) Installation of E-Mail & Internet Services.
- c) Installation of net version software e.g. Office 2000, CAD, Photoshop etc.
- d) Implementing Microsoft W.W.W. (World Wide Web) services (IIS)
- e) Implementing & installing Internet Services
- f) Implementing FTP , SMTP , NNTP ,Security Features for Web server.
- g) Indexing Web sites using Microsoft site Server Express.

7) DIAGNOSTIC: -

Study of network Debugging Tools , E-Mail , Internet , GOPHER ,WWW, FTP services.
Debugging in window 2000.Debugging in Network Printer.

GUIDELINES FOR QUESTION PAPER SETTERS

Q. no.1	Compulsory (Objective type - covering entire syllabus.)	20 marks
Q. no.2 to 8	Solve any five questions from Q. 2 to 8 (Subjective type)	16 marks each

RECOMMENDED BOOKS FOR REFERENCE

4 in 1 Networking

BPB



INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

DIPLOMA IN ELECTRONIC ENGINEERING SERVICES (DEES - ER)

THEORY PAPER I :	Basic Electronics	100 Marks
THEORY PAPER II :	Signal & Advance Electronics	100 Marks
PRACTICAL I & II :	Two Separate Practical Each practical Scheme is same as List given Practical 100 Marks each	200 Marks
		Total : 400 marks



Paper I: Basic Electronics

1. D.C. circuits

Concepts of electricity. Current, voltage and resistance, potential difference, power, electrical energy and their units. Ohm's law. Series, parallel and compound combination of resistors, specific resistance, effect of temperature on resistance. Kirchoff's laws, Heating effect of current and concept of electric power.
Sources of voltage: Primary and secondary cells.

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. Capacity of parallel plate capacitors.
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. Time constant in R-C circuits, simple problems.

3. Electro- Magnetism

Magnetic field production by flow of current, m.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. Cycle, frequency, period, amplitude, instantaneous value, average value, r.m.s. value and peak value, form factor (definitions only.) R-L, R-C, R-L-C series circuits. 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. Transformer

Principles of transformer, construction, voltage and current transformation.
Current and voltage relationship, autotransformer and its uses, Instrument transformer.
Different types of transformers, and specifications of all types of transformers.
Losses in a transformer.

6. Semi conductor physics

Atomic structure and energy levels, concept of insulators, conductors and semi conductors, atomic structure of Germanium (Ge) and Silicon (Si), covalent bonds.
Intrinsic and extrinsic semi conductor, trivalent and pentavalent impurities, doping of impurity and N type semiconductors and their conductivity. Effect of temperature on conductivity of intrinsic semi conductor. Minority and majority carriers.

7. Semi conductor diode

PN junction diode, current flow in PN junction, Drift and diffusion current, depletion layer, forward and reverse biased PN junction, potential barrier, 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, shunt capacitor filter, series inductor filter, LC filter and π filter. Comparison between three types of rectifiers.
Types of diodes, characteristics and applications of Zener diodes. Avalanche breakdown.
Study of power supply circuits. Series and shunt regulators, Regulated power supplies, Over voltage and over load protection. Three Terminal voltage regulator ICs. Power supplies using ICs like LM 723.

8. Introduction to Bipolar Transistor

Concept of bipolar transistor, structure, PNP and NPN transistor, their symbols and 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. 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.

9. 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. Phase reversal of output voltage with respect to input voltage.
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.
Study of I.C. ,types, use.
Study of audio amplifiers.
Wave Shaping Circuits

General idea about different wave shapers.
RC and RL integrating and differentiating circuits with their applications.
Diode clipping and clamping circuits.

10.Oscillator

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

11 Fault finding:

Servicing techniques, cold and hot tests - its inference, Signal substitution tests.
Waveform analysis.

GUIDELINES FOR QUESTION PAPER SETTERS

Q. no.1	Compulsory (Objective type - covering entire syllabus.)	20 marks
Q. no.2 to 8	Solve any five questions from Q. 2 to 8 (Subjective type)	16 marks each

Practical I

1. Study of hand tools.
2. Study and use of multimeter.
3. Study and testing of A.C. supply.
4. Study and use of a series test board.
5. Study and testing of components-
6. Verification of Ohm`s law.
7. Verification of series circuit properties.
8. Verification of parallel circuit properties.
9. Measurement of power consumption by measuring voltage & current.
10. Soldering practice.
11. Study of signal generators.
12. Study of signal injectors.
13. Study of C.R.O.Study of waveforms.
14. Study of a transformer.
15. Measurement of a voltage & current of primary & secondary windings of a transformer.
16. Study of a resonance circuit . Observe waveform.
17. To plot the V I characteristic curve of a diode.
18. To study the properties of a diode as clipper and clamper.
19. Study of half wave rectifier with or without filters.
20. Study of full wave rectifier with or without filters.
21. Study of bridge rectifier with or without filters.
22. Zener diode Characteristics.
23. Study of Zener as a voltage stabilizer.
24. To determine percentage Line regulation.
25. To determine percentage Load regulation.
26. To plot Collector current collector voltage graph.

27. Study of CE,CB,CC amplifiers.
28. Study of single stage CE amplifier.
29. Study of RC coupled amplifier.
30. Study of Push pull power Amplifier.
31. Study of audio amplifier using IC CA 810.
32. Study the integrating and differentiating circuit.
33. Study of Hartley oscillator.
34. Study of Colpitts oscillator.
35. Study of R-C Phase shift oscillator.
36. Study of Wein bridge oscillator.
37. Study of an astablemultivibrator.
38. Study of a monostablemultivibrator.
39. Study of a bistablemultivibrator.
40. Tracing and testing of transistorized audio amplifier.
41. Tracing and testing of IC TB|A 810 audio amplifier.
42. Fault finding practicals(Atleast 20 faults in power supply & audio amplifiers.)

Paper II: Signal & Advance Electronics

1. Advanced Devices:

Study of FET, UJT, SCR, DIAC, TRIAC, MOSFET, CMOS, IGBT, photo diodes, photo transistors, LED, IR sensors, IR transmitters, opto couplers etc. - use, application.

2. 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, Subtractor, differentiator, and integrator.

Concept of Schmitt triggers circuit and sample/hold circuit using operational amplifier and their applications.

3. 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.

4. 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. Truth table and Boolean equation for simple problem. Implementation of Boolean (logic) equation with gates.

Logic family. 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) Parity, single and double parity and error detection
- c) Alpha numeric codes: ASCII and EBCDIC

5. Arithmetic circuits and Latches and flip flops

Half adder and Full adder. Half and Full Subtractor. 4-bit adder/Subtractor.
Latch - working and applications. Flip flops , types, - RS, T, D, JK, and Master/Slave JK flip-flops - operation, truth table & timing diagrams. Difference between a latch and a flip-flop.

6. 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

7. 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

8. 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

9. 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.

10. Microprocessor – 8085

Introduction: Microprocessors – evolution, importance and Application. Simple programmes.

11. Microcontroller

Introduction to 8051. Interfacing of 8051. Simple programs.

GUIDELINES FOR QUESTION PAPER SETTERS

Q. no.1	Compulsory (Objective type - covering entire syllabus.)	20 marks
Q. no.2 to 8	Solve any five questions from Q. 2 to 8 (Subjective type)	16 marks each

Practical II

1. To study characteristics of a FET.
2. To study characteristics of an UJT.
3. To study characteristics of a SCR.
4. To study characteristics of a DIAC.
5. To study characteristics of a TRIAC.
6. To study characteristics of a MOSFET.
7. To study characteristics of a CMOS.
8. To study characteristics of a Photo Diode.
9. To study characteristics of a Photo Transistor.
10. To study characteristics of IR devices.
11. To study characteristics of Opto coupler.
12. Study of IC 741 (op-amplifier) as Inverter and non-inverter.
13. Study of IC 741 (op-amplifier) as Adder and Subtractor.
14. Study of Logic gates - AND, OR, NOT, NAND, NOR, EX-OR, and EX-NOR (Using IC's).
15. Study of RS flip flop .
16. Study of JK and Master Slave JK Flip Flop.
17. Study of Half Adders - Subtractor (Using IC Logic gates)
18. Study of Full adder - Subtractor (Using IC Logic gates)
19. To study details of counters IC's like 7490
20. To study 7 segment display.
21. Observe the output of decade counter 7490 on a seven segment display using a decoder.
22. Study of 4/8 bit A/D converter using IC.
23. Study of 4/8 bit D/A converter using IC.
24. To study shift register IC's like 7495.
25. Study of Multiplexer using IC 74153.
26. Study of Demultiplexer using IC 74139.
27. Study of 8085 microprocessor.
28. Simple programmes on 8085.
29. Study of 8051 microcontroller.
30. Simple programmes on 8051.

INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

DIPLOMA VIDEO TELEVISION ENGINEERING SERVICES (DVTES)

THEORY PAPER I :	Syllabus for this paper is same as Certificate Course in TELEVISION SERVICING [TVS]	100 Marks
THEORY PAPER II :	Syllabus for this paper is printed below	100 Marks
PRACTICAL I& II :	Two Separate Practical Each practical Scheme is same as per respective Course. Practical 100 Marks each – Total 200 Marks.	200 Marks
		Total :400 marks



(DVTES - PAPER - II)

THEORY SYLLABUS

1) TELEPHONE TECHNOLOGY: -

- a) Basic functions of telephone.
- b) Block diagram of digital telephone.
- c) Block diagram of cordless phone.
- d) Introduction of Mobile phones, EPBX.
- e) Introduction to Different section of Telephone (Ringer, Dialer, Keyboard matrix, Voltage dropper, Line IN / Protector ckt. and Speech & sound amplifier.
- f) Caller ID,

2) OPERATIONAL AMPLIFIER: -

- a) DC amplifier
- b) Transistor differential Basic Op-Amp
- c) Op-Amp characteristics & parameters
- d) Application of Operational amplifier:-
 - 1) Inverting amplifier. 2) Non-inverting amplifier. 3) Adder &Subtractor.
 - 4) Voltage follower. 5) Comparator. 6) Integrator & Differentiator.
 - 7) Phase lock loop (PLL) 8) Use in a TV receiver and CD player.

3) CD PLAYER: -

- a) Compact Disk Structure.
- b) Constant linear velocity (CLV) recording system.
- c) Advantage of digital storage.
- d) SMD (Surface mounting devices) Technology
- e) CD Encoding process block diagram.
- f) Block diagram of CD player.
- g) Optional Pickup unit components.
- h) Idea about servo system: -
 - 1) Tracking Servo
 - 2) Carriage Servo
 - 3) Spindle Servo.
- i) Different motors used in CD players & their functions only: -
 - 1) Tray or loading motor (carriage motor)
 - 2) Slide or sled or feed motor.
 - 3) Spindle or Disc or Turn table motor.
- j) Different sensors in CD players.
- k) Different types of Disc.
- l) Various parts of CD Mechanism & their function.
- m) Various functions carried out by system control processor.
- n) Various connectors & cards used in CD/MP3 player.
- o) Up gradation, graphic, equalizer & Digital surround sound.

4) VCD PLAYER: -

- a) Introduction to VCD & DVD.
- b) Comparison between CD ROM / DVD.
- c) Different types of DVD ROM
- d) Home Theater System: -
 - 1) Introduction to Home Theater system
 - 2) Installation of Home Theater.

5) ADVANCED TV TECHNOLOGY SYSTEMS: -

- | | | |
|--------------------|---------------------|------------------|
| Introduction to: - | 1) Video Projectors | 2) Plasma TV |
| | 3) LCD TV | 4) Projection TV |

6) CD/MP3/DVD PLAYER SERVICING: -

- a) Test Equipment and Tools safety precaution.
- b) Adjustment, cleaning, and maintenance of electrical & mechanical parts.
- c) Troubleshooting: -
 - 01) General Troubleshooting procedure.
 - 02) Troubleshooting due to Power supply.
 - 03) Troubleshooting due to Pickup Unit.
 - 04) Troubleshooting due to Carriage Motor.
 - 05) Troubleshooting due to Feed motor.
 - 06) Troubleshooting due to Spindle motor.
 - 07) Troubleshooting due to Sensors.
 - 08) Troubleshooting due to Tracking servo.
 - 09) Troubleshooting due to Carriage servo.
 - 10) Troubleshooting due to Spindle servo.

7) SATELLITE COMMUNICATION: -

- a) Introduction to Satellite communication & Reception.
- b) Introduction to Dish Antenna, Different parts of Dish Antenna.
- c) LNB Assembly.
- d) Assembly of Dish Antenna (TATA SKY, MEPL, Dishnet etc.).
- e) Alignment of Dish antenna.
- f) Setting of different channels.
- g) Difference between Free & Pay channels.

GUIDELINES FOR QUESTION PAPER SETTERS

Q. no.1	Compulsory (Objective type - covering entire syllabus.)	20 marks
Q. no.2 to 8	Solve any five questions from Q. 2 to 8 (Subjective type)	16 marks each

PRACTICAL EXAMINATION - I

Practical – I : - 100 Marks – 2 Hours.

Each candidate will have to locate three faults. Each fault will give 8 marks to locate fault and 12 marks for write up. One fault in Power supply or CRT circuit, One fault in Video Tuner, VIF, Sound circuit and One fault in Scanning circuits. The write up indicate the logical method of located faults.

60 Marks

Journal / Term work

20 Marks.

(Journal should contain minimum 50 recommended experiments)

Oral examination

20 Marks.

PRACTICAL EXAMINATION - II

Practical – II : - 100 Marks – 2 Hours.

Each candidate will have to locate three faults. Each fault will give 8 marks to locate fault and 12 marks for write up. One fault in Power supply or CRT circuit, One fault in Video Tuner, VIF, Sound circuit and One fault in Scanning circuits. The write up indicate the logical method of located faults.

60 Marks

Journal / Term work

20 Marks.

(Journal should contain minimum 50 recommended experiments)

Oral examination

20 Marks.

RECOMMENDED BOOKS FOR REFERENCE

Operation Amplifier

OP-Amp Projects

Modern CD Player

Modern Satellite & Cable TV Manual

BPB

BPB (ManaharLotia)



**INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI
DIPLOMA ELECTRONICS & TELECOMMUNICATION
ENGINEERING SERVICES
(DETES)**

THEORY PAPER I -	Syllabus for this paper is same as Certificate Course in ARS / DEES (ER) – I	100 Marks
THEORY PAPER II -	Syllabus for this paper is same as DEES (ER) - II	100 Marks
THEORY PAPER III -	Syllabus for this paper is same as Certificate Course in TVS	100 Marks
THEORY PAPER IV -	Syllabus for this paper is same as DVTES - PAPER - II	100 Marks
PRACTICAL - I -	Practical Syllabus for this Practical No. 1 is same as ARS (Practical – I)	100 Marks
PRACTICAL - II -	Practical Syllabus for this Practical No. 1 is same as TVS (Practical – I)	100 Marks
PRACTICAL - III -	Practical Syllabus for this Practical No. 1 is same as CTVS / DVTES – II (Practical – II)	100 Marks
Total - 700 Marks		



INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI

Diploma in Audio Radio Servicing.

Paper I: Basic Electronics (Same as DEES I)

Paper II : Digital & Advanced Electronics (Same as DEES II)

Paper III: Audio Radio Servicing

1. Revision

- a) Revision of transistor basics. - biasing, Configuration of transistors, Classes of amplifiers,, coupling of amplifiers,feedbacks.
- b) Revision of audio amplifiers.

2. Audio amplifiers:

- a) Double ended & Single ended Push pull output amplifiers.
- b) Complimentary symmetry output amplifier.
- c) Preamplifiers and driver amplifiers.
- d) Audio amplifies using ICs.
- e) Tone control circuits.-Bass & Treble controls. Active tone controls.
- f) Speakers, Types - woofer, tweeter, squawker. Enclosures, crossover networks.
- g) Audio output measurement - RMS, PMPO and Decibel.
- h) Hi-Fi amplifiers, Stereo amplifiers- balance control, Equalizers.
- i) Home theatre, 2.1 and 5.1 systems. Surround sound system, echo amplifier.

3. Study of simple intercom circuit.

- a) Intercom Master – slave Circuit. Connections of one master & 2 slaves. Ringer. Study of Simple telephone receiver. Pulse & Tone dialing. Caller id phone.
- b) Simple EPBX system.

4. Study of P.A. amplifier.

Preamplifiers for mikes.Audio mixers.Installation of the P.A. system.connections of multiple speakers and horns with proper impedance matching. Use of line transformers.

5. Audio recording:

- a) Principles of magnetic recording. Eddy current and Hystersis losses.
- b) Magnetic tape - material used, sizes etc., audio cassettes.
- c) Audio heads- working, construction, types. Head gap. Core used.
- d) Microphones: Working, types,

6. Tape recorders:

- a) Study of tape recorders. Tape deck mechanism.
- b) Tape spools, Capstan, flywheel, motion to take up spool, leaf switch, brakes, fast forward,
- c) Rewind mechanism, pause control, recording mechanism.
- d) Block diagram of mono & stereo tape recorder. equalizing circuits, ALC,

7. CD / DVD player:

- a) Principles of digital recording - Advantages & disadvantages. CAV, CLV.
- b) Difference between CD & DVD. Different recording formats like wave, MP3/4etc. CD/DVD mechanism. Study of different motors & sensors used. Different types of AV in & out connections.(HDMI, optical, S & component video)

8. Radio propagation:

- a) Electromagnetic waves
velocity, frequency, wavelength. Propagation of radio signals. Ground waves, sky waves, Reflected sky waves. Frequency allocations for the broadcasting.
- b) Need for modulation
Types of modulation.AM, FM, PM. Advantages & disadvantages.single & double sideband transmission. Block diagram of AM and FM transmitters.
- c) Radio communication.
Signal to noise ratio. Block diagram of AM radio - TRF radio, superhet radio. Quality factors of the radio. Mixer, IF amplifier & detector stages. Circuit description. Block diagram of FM radio. FM detectors. Circuit description of FM radio. Digital tuning.

9. Instruments:

Study of instruments used for servicing. Study of multimeters, DMM, Signal generator, signal injector etc.

10. Troubleshooting:

Troubleshooting of audio and radio equipments. Importance of cold tests (preliminary tests). Analysis by resistance and voltage measurements. Signal substitution methods. Waveform analysis. Study of normal faults in audio amplifiers, radio sets etc.

Practicals:

1. Study & testing of special components: IFTs, Output transformer, driver transformers, Antenna& oscillator coils, DC motors, R/P & Erase heads, Band switches, R/P switch,
2. Study & tracing of simple power supplies. (Battery eliminators)
3. Study & testing of regulated power supplies. (at least 3 practicals)
4. Study & testing of SMPS used in CD/DVD.
5. Tracing & testing of transistorized audio amplifiers used in radio sets. (at least 3 practical)
6. Tracing & testing of I.C. audio amplifiers used in radio sets. (at least 3 practicals)
7. Tracing & testing of HiFi amplifiers
8. Study of Speakersystem used for HiFi amplifier.
9. Study of 2 way & 3 way crossover network
10. Study of P.A. amplifier.
11. Tracing & testing of simple intercom system.(Master slave)
12. Study of a radio receiver.
13. Tracing & testing of IF/RF stages of a radio.
14. Study of a multi band radio.
15. Tracing of a simple phone receiver
16. Study of a caller id phone.
17. Study of a EPBX system.

18. Tracing & testing of simple tape recorder.
19. Tracing & testing of stereo tape recorder.
20. Study of 2 in 1.
21. Study & testing of a CD player.
22. Study & testing of a DVD player.
23. Study of instruments like multimeters, signal injector, signal generator & CRO.
24. Fault finding in power supplies, audio amplifiers, PA amplifiers, intercom systems, radio receivers, CD/DVD players & phone receivers. (at least 25 faults)

Practical Exam:

A student will have to carry out 3 fault finding practical.

Fault I: Power supply or audio amplifier. 25 marks

Fault II : Audio amplifier (HIFI, Stereo,PA or taperecorder) : 25 marks

Fault III: Radio, CD/DVD player or phone receiver 25 marks

Oral: 15 marks

Journal : 10 marks

Total : 100 marks

Scheme of exam

Paper I: 3 hours 100 marks

Paper II: 3 hours 100 marks

Paper III: 3 hours 100 marks

Practical I : 3 hours, 100 marks

Practical II : 3 hours, 100 marks

Practical III : 3 hours, 100 marks

INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI
DIPLOMA COMPUTER HARDWARE ENGINEERING SERVICES
(DCHES)

THEORY PAPER I :	Syllabus for this paper is same as Certificate Course in Digital Electronics & Microprocessor [DEM]	100 Marks
THEORY PAPER II :	Syllabus for this paper is same as Certificate Course in Computer Maintenance [CM]	100 Marks
PRACTICAL I& II :	Practical Syllabus for this Practical No. 1 is same as DEM	100 Marks
	Practical Syllabus for this Practical No. 2 is same as CM	100 Marks

Total :400 marks



INDIAN TECHNICAL EDUCATION SOCIETY, MUMBAI
DIPLOMA COMPUTER NETWORKING ENGINEERING SERVICES
(DCNES)

THEORY PAPER I :	Syllabus for this paper is same as Certificate Course in Digital Electronics & Microprocessor [DEM]	100 Marks
THEORY PAPER II :	Syllabus for this paper is same as Certificate Course in Computer Maintenance [CM]	100 Marks
THEORY PAPER III :	Syllabus for this paper is same as Certificate Course in COMPUTER NETWORKING [CCN]	100 Marks
PRACTICAL I& II :	Practical Syllabus for this Practical No. 1 is same as DEM	100 Marks
	Practical Syllabus for this Practical No. 2 is same as CM	100 Marks

Total : 500 marks

