

Course: B. Sc. II Year with Electronic Equipment Maintenance

Scheme of Examination for Semester 3 & 4

Semester - 3

S.No.		Paper	Marks	Marks	Exam. Duration
			Internal Assessment	External Marks	
1.	Paper-I	Operational Principles & Repair of Audio Equipment	10*	30	3 hours
2.	Paper-II	Microprocessor 8085	10*	30	3 hours

Semester - 4

S.No.		Paper	Marks	Marks	Exam. Duration
			Internal Assessment	External Marks	
3.	Paper-I	Operational Principles of TV Receiver	10*	30	3 hours
4.	Paper-II	Microprocessor Interfacing & Microcontrollers	10*	30	3 hours
5.	Paper-III	Lab. Practical -I (Sem 3 & Sem 4)	-----	70	6 hours (two sessions morning & evening)
6.	Paper-IV	Lab. Practical-II (Sem 3 & Sem 4)	-----	70	3 hours (one session)

* 10% on the basis of two hand written assignments, 5% on the basis of one class test & 5% on the basis of attendance of the student.

B. Sc. II Year with Electronic Equipment Maintenance Scheme of Examination for Semester 3 & 4

I. Theory : Two papers of 30+10* marks each in each semester are as follows:-

Semester	Paper	Title of Paper	Max. Marks
III	I	Operational Principles & Repair of Audio Equipment	30+10*
	II	Microprocessor 8085	30+10*
IV	I	Operational Principles of TV Receiver	30+10*
	II	Microprocessor Interfacing & Microcontrollers	30+10*

* **Internal Assessment: 10+10=20 marks in both the semesters that will be based on the two assignments, a house test and the attendances.**

Note: The syllabus in each paper is divided into 4 units. Two questions will be set from each unit. A student is to attempt 5 questions in all, selecting one question from each unit. Question No. 1, based on 4 units, is compulsory.

II. Lab. Practical – I : 70 marks

Note: For Lab. Practicals:-

1. A student is required to perform a minimum of 5 experiments from each section.
2. The practical examination will be held at the end of 4th semester in two sessions of three hours each with first session starting in the evening of the first day and second session in the following morning.
3. Maximum number of students should not exceed ten in one group during course of studies as well as annual examinations.
4. Distributions of marks is as under:
Experiment Performed: **15+15**
Lab Record: **20** Viva Voce: **10+10**

III. Lab. Practical – II : 70 marks

A Hand-on-Practice-cum-Design Lab. is mandatory for every student where a student has to work on basic Electronic Circuit and PCB Layout Design through Standard Software like Multisim and Ultiboard in the College Laboratory and has further to furnish a minor final product in the Electronics Workshop on a topic being assigned by his/her mentor. Apart from Practical Lab–I classes (mentioned above at Sr. No. II), a student has to work for two additional hours per week in laboratory during the session. At the end of session, each student has to submit a brief report on his final product being furnished. The demonstration of finished product and the report will be evaluated by a panel of two examiners (One Internal and One External) before the start of next session.

Note:- Maximum number of students should not exceed ten in one group during course of this Hand-on-Practice-cum-Design Lab. in the laboratory.

Semester-3
Subject: EEM
Paper-I (Theory)

Nomenclature : Operational Principles & Repair of Audio Equipment

Max. Marks: 30+10*

Time : 3 hrs.

Unit-I

Receiving Antenna: Types of antenna like wire, loop, dish, yagi, telescopic, their construction and operating principles.

Superheterodyne Receivers: Principles, advantages, block diagram, RF input and coupling AF coupling arrangements, RF amplifiers, mixer, local oscillator, IF amplifier, detector, audio amplifier, loud speaker, power requirements.

Unit-II

Cellular Mobile Systems: Basic Cellular System, Performance Criteria, Operation of Cellular Systems, Co-Channel Interference Reduction Factor, Cell Splitting, Components of Cellular Systems, Difference between Analog and Digital Cellular Systems, Overview of GSM and CDMA type digital cellular systems.

Optical Recording: Types, methods and reproduction of Optical recording of sound, Compact Disc, Optical recording on disc, playback process, comparison of Compact and Conventional Discs, DVD Mechanism (Basic Idea).

Unit-III

High Fidelity & Stereophony: Fidelity, High Fidelity, meaning of Stereophony, difference between Stereophony and Monophony, Ideal and Practical Stereo System, Quadraphonic sound system, stereophonic recording on Disc and Reproduction, block diagram of stereo recording on disc, stereo recording on tape and reproduction, tape cartridge and cassette tape, Hi-Fi stereo reproducing system, Stereo Controls, Troubleshooting of Stereo Amplifier.

Unit-IV

Video Recording: Video recording on disc, TeD system, CED system, laser vision, optical memory disc.

Public Address System: Need and Use, Block Diagram, requirements of PA system, Typical P.A. Installation Planning. Troubleshooting of PA system.

Troubleshooting: General troubleshooting procedure, physical inspection, testing of power supply unit, Identifying Faulty section and faulty stage and faulty components, repair, servicing and maintenance, Checking specifications.

Ref.:

1. Radio Engineering by G.K. Mithal
2. Wireless & Cellular Communication by William C.Y. Lee
3. Audio and Video Systems by R.G. Gupta
4. Principles of communication: George Kennedy

Semester-3

Subject: EEM

Paper-II (Theory)

Nomenclature : Microprocessor 8085

Max. Marks: 30+10*

Time : 3 hrs.

Unit-I

Microprocessor Architecture: Microprocessor Architecture and its Operations, 8085 Microprocessor, 8085 MPU and its Architecture, Fetching, decoding and execution of an Instruction, concept of Peripheral I/O and Memory Mapped I/O.

Unit-II

Instruction Set of 8085: 8085 Programming Model, Instruction Classification, Instruction and Data Format, Addressing Modes. Data Transfer Operations, Arithmetic Operations, Logic Operations, Branch Operations.

Unit-III

Programming Techniques: Looping, Counting and Indexing, Additional Data Transfer and 16-bit Arithmetic Instructions, Arithmetic Operation related to Memory, Logic Operations: Rotate, Compare, Counters and Time Delays with few examples.

Unit-IV

Stacks and Subroutines: Stack, Subroutine, Restart, conditional call, and return instructions; BCD Addition, BCD Subtraction, Introduction to advanced instructions and applications, multiplication, subtraction with carry.

Ref.:

1. Microprocessor Architecture, Programming & Applications with 8085 by R. S. Gaonkar.
2. Introduction to Microprocessors by A.P. Mathur.

Semester-4

Subject: EEM

Paper-I (Theory)

Nomenclature : Operational Principles of TV Receiver

Max.Marks: 30+10*

Time : 3 hrs.

Unit-I

Television Receiver: schematic block diagram and functions of different sections.

Analysis of TV Picture: Gross structure, Image continuity, number of scanning lines, flicker, fine structure.

Composite Video Signal: Video Signal dimensions, Horizontal synchronous details, Vertical synchronous details, channel bandwidth, vestigial sideband transmission

Unit-II

Picture Tubes: Monochrome and Colour, Beam deflection, screen phosphor, faceplate, picture tube circuit controls.

Video Detector: Basic idea of video signal detection, basic video detector, video detector requirements.

Video Section Fundamentals: Video amplifiers, Transistor video amplifier, contrast control methods, Direct coupled video amplifier, Advantages of AGC, various AGC systems, merits of keyed AGC system.

Unit-III

Synch Separation Circuits: Synch separator – basic principle, transistor synch separator.

Synch Processing & AGC Circuits: Synch waveform separation, Vertical synch separation, Horizontal synch separation, Automatic Frequency Control.

Deflection Oscillators: Deflection current waveform, generation of driving voltage waveform, Requirements of vertical deflection stage (in brief), IC for vertical system, Horizontal combination IC CA 928,

Unit-IV

Sound System: Sound signal separation, sound take off circuits, sound section IC (CA 3065), audio O/P stage (CA 810).

RF Tuner: Tuner operation and its functions, various sections of VHF tuner.

Video IF Amplifier: Video IF Section, IF amplifier, Adjacent channel interference, IF sub-system employing IC 3068, Low voltage power supply, S.M.P.S.

Ref.:

1. Monochrome TV and Colour TV by R.R. Gulati.
2. Basic Radio and Television by S.P. Sharma.

Semester-4

Subject: EEM

Paper-II (Theory)

Nomenclature : Microprocessor Interfacing & Microcontrollers

Max. Marks: 30+10*

Time : 3 hrs.

Unit-I

Interrupts & Interfacing Data Converters: 8085 Interrupt, 8085 Vectored Interrupts, Direct Memory Access, Digital-to-Analog Converter (basic concepts, D/A Converter Circuits, Interfacing 8-bit D/A Converter), Analog-to-Digital Converter (basic concepts, Successive Approximation A/D Converter, Interfacing 8-bit A/D Converter).

Unit-II

Programmable Interface Devices: 8155 Multipurpose Programmable Device (I/O ports & Timer, Interfacing 7-segment-LED), 8255 programmable peripheral interface (block diagram, modes), 8253/8254 Programmable Interval Timer (block diagram, programming 8254), 8259 Programmable Interrupt Controller (block diagram, interrupt operation and features).

Unit-III

Microcontroller 8051: Overview of 8051 family (in brief), inside 8051, assembling & running programs, program counter and ROM space, data types and directives, flag bits and PSW register, register banks and stack, loop and jump instructions, call instructions, time delay for 8051.

Unit-IV

8051 Programming: 8051 I/O Programming, I/O Bit Manipulation Programming, Arithmetic Instructions, signed number concepts and arithmetic operations, logic and compare instructions, rotate instruction and data specialization.

Ref.:

1. Microprocessor Architecture, Programming & Applications with 8085 by R. S. Gaonkar.
2. 8051 Microcontroller & Embedded Systems by M.A. Mazidi, J.G. Mazidi & R.D. McKinlay.
3. The 8051 Microcontroller, architecture, programming and applications by K.J. Ayala.

SEMESTER 3 & 4
Subject: EEM
Paper-III (Practical)

Max. Marks: 70
Time: 3+3 hrs.

List of Experiments:

Note: Minimum 5 experiments are to be performed from each section.

Section-A

1. Study of PCB Layout sequences (for atleast one circuit).
2. Development of Soldering/Desoldering skills by constructing one circuit and its testing.
3. Study of Opto-Electronic Devices.
4. Study of AM modulation and Demodulation.
5. Study of FM modulation and Demodulation.
6. Study of Radio Receiver testing (noting waveforms and voltages at different check points, fault finding and troubleshooting).
7. Study of Tape Recorder/Stereo Amplifier (different parts of tape mechanism, testing of preamplifier and power amplifier sections by noting waveforms/voltages).
8. Study the mechanism of CD-ROM/DVD Drive by noting voltages at various check points.
9. Study of PA system and its testing.
10. Design UJT as relaxation Oscillator and calculate its frequency of oscillation.
11. Design power controller using SCR/Diac/Triac.
12. Study of EPABX, wiring and connectivity with telephone instruments.

Section-B

1. Familiarization with 8085 based microprocessor trainer kit by identifying different IC chips and their utilities. Understanding the kit by entering/executing a simple assembly language program and also its various functions like, insertion, deletion, block-move, block-fill, examining registers/memory, single step, etc.
2. Writing 8085 program for addition and subtraction of single byte and multibyte numbers.
3. Writing 8085 program for multiplication and division of two numbers.
4. Write 8085 program for arranging an array of data in ascending/descending order.
5. Write 8085 program for the generation of time delays of the order of 1-5 seconds and its testing by interfacing LED's to make them glow in a given sequence.
6. Write 8085 program for the generation of atleast one type of waveform.
7. Study the IC Tester application on 8085 μ P kit.
8. Study the Traffic Light Controller application of 8085 μ P kit.
9. Study the Stepper Motor Control application of 8085 μ P kit.
10. Study the A/D conversion or D/A conversion through 8085 μ P kit.
11. Familiarization with 8051 based microcontroller trainer kit. Practice in entering and executing simple programs.
12. Design a square wave of varying duty cycles on 8051 based microcontroller trainer kit.