

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

SYLLABUS FOR T.Y.B.Sc.

ELECTRONICS.

(W.E.F. June, 2004)

Course Structure

There will be six compulsory theory papers & three compulsory practical courses of hundred marks each.

Theory Courses

- Paper – I : Semiconductor Physics and Electrodynamics
Paper – II : Electronic Communication
Paper – III : Microprocessor X86 Family
Paper – IV : Programming in "C"
Paper – V : Industrial and Power Electronics
Paper – VI : Consumer Electronics and Microcontroller

Practical Courses

- Paper – VII : Practical – I : General lab.
Paper – VIII : Practical – II : Microprocessor 8086 Assembly Language Programming and "C" - language programming
Paper – IX : Practical – III : Project & Industrial visit

Four **Instruction**
Two tutorials and two seminars
shall be conducted per paper,
excluding the regular teaching schedule.

T.Y.B.Sc. Electronics Paper - I
Semiconductor Physics and Electrodynamics

Objectives :

1. To enrich the understanding of fundamentals required for electronic devices and communications systems.
2. To have an awareness of fabrication of electronic components and integrated circuits.

Semiconductor Physics

Unit - 1: Crystal structure :

Lattice, basis and crystal structure, translational vectors, unit cell, primitive translational vectors for SC, BCC and FCC, co-ordination number, atomic radii, packing functions for SC, BCC and FCC structure, Miller indices, Inter planer distances, Reciprocal lattice and it's properties, reciprocal lattice of SC, BCC and FCC lattice.

(12 P, 12 M)

Unit - 2 : Band Theory of Solids :

Nearly free electron model, origin of energy bands, electronic motion according to the band theory (effective mass). Distinction between metal, semiconductor and insulator, concept of hole.

(10 P, 8 M)

Unit - 3 : Charge carrier in semiconductor :

Semiconductor material, direct and indirect semiconductors, Intrinsic and Extrinsic semiconductor, carrier concentration-Fermi level and Electron-hole concentration at equilibrium, Drift of carriers in electric and magnetic fields-conductivity and mobility, Hall effect.

(12 P, 12 M)

Unit - 4 : P-N Junction :

Fabrication of P-N junction-mention different methods of fabrication of P-N junction, diffusion method. Equilibrium conditions-contact potential, space charge at junction, forward and reverse bias junction-qualitative description of current flow at a junction, reverse-bias break down-Zener and avalanche breakdown.

(12 P, 12 M)

Unit - 5 : Integrated circuits :

Fabrication of BJT, fabrication of monolithic circuits (introduction) monolithic circuit elements-merged transistors, MOS transistors (field dropping and channel length) integration of other circuit elements-resistors, capacitors.

(6 P, 6 M)

North Maharashtra University, Jalgaon

Syllabus

**T.Y.B.Sc. Electronics
(with effect from June-2004)**

Electrodynamics

Unit - 6 : Electrostatics :

Coloumb's law, electric intensity, electric intensity due to several point charges, electric potential, electric potential due to several charges, electric flux, flux density, Gauss's law in electrostatics, Poisson's & Laplace equations.

[12 P, 10 M]

Unit - 7 : Electrostatics in dielectrics

Polarization, D,P, E vectors and their interrelation, dielectric constant and electric susceptibility and their interrelation, Boundary condition for E and D at the interface of two dielectric media.

[10 P, 8 M]

Unit - 8 : Magnetostatics :

Magnetic induction, Amperes force law, Lorentz force law, Biot Savart law, force between two current carrying coils, Amperes circuital law, B, H, M vectors and their interrelation, Hysteresis, Boundary conditions for B & H at the interface of two media.

[16 P, 16 M]

Unit - 9 : Electromagnetic Waves :

Faradays law of electromagnetics induction, Modified Amperes law, Maxwell's Equations, plane wave equation and its solution in free space, Pointing vector,

electromagnetic energy, reflection and refraction of plane electromagnetic wave at non-conducting surface (normal incidence).

[14 P, 16 M]

References :

Semiconductor Physics

1. Fundamentals of SSP – Saxena, Gupta, 13th edⁿ 1994, Pragati Prakashan
1. Solid state electronics devices - Ben G Streetman, 3rd edⁿ 1995, PHI Publication
2. Physics of electronic materials - Kassap
3. Introduction to solid state physics - C.Kittle, 5th edⁿ 1993, WEL Publication

Electrodynamics

1. Electromagnetics - B.B. Laud, 2nd edⁿ 1992, WEL Publication
2. Eelctrodynamics – Kumar Gupta, 14th edⁿ 1999 Pragati Prakashan
- Classical Electrtodynamics- Jackson, 2nd edⁿ 1993, WEL Publication
4. Antena and wave propagation - K.D. Prasad, 3rd edⁿ 1996, Satya Prakashan
5. Foundation of electromagnetic theory - Reits & Miltford, 3rd edⁿ 1994, Narosa Prakashan
8. Introduction to electromagnetic fields & waves - Corson & Lorrain, 2nd edⁿ, CBS Publication

Electronics Paper - II
Electronic Communication

Objectives :

1. To acquaint with basic concepts of communication Systems.
2. To know the various modulations techniques.
3. Conceptual study of T.V. system is expected.
4. To develop the ideas of optical fiber communication and satellite communication.

Unit - 1: Communication Broadcasting System :

Block diagram of communication system function of each block. Modulation ,Types of modulation, Need of modulation ,Noise (definition and types)
(5P , 5M)

Unit - 2 : Amplitude Modulation and detection :

Theory and mathematical Expression for AM. AM modulation factor; its derivation and importance. Frequency spectrum, Power relation in carrier and side band. Idea of single Side band, Double side band and carrier suppression. Transistorised circuits For AM modulation. Balanced modulator.

Block diagram of AM transmitter. Function of each block in brief. AM Detection; Diode as AM detector input output wave forms.

AM receiver TRF type, disadvantages. Principle of superhetrodyne. Block diagrams of AM superhetrodyne. Receiver & function of each block in brief.
(16P, 16M)

Unit - 3 : Frequency modulation and detection :

Theory and mathematical expression for FM, Frequency deviation, Frequency modulation index, and comparison between AM & FM. FM generation system- mention different types FM modulation- FM reactance modulator FM detection- Phase shift discriminator FM transmitter & receiver block diagram & explanation.
(14P, 14M)

Unit - 4 : Pulse Modulation -

Idea of pulse modulation, Analog pulse modulation Sampling theorem PAM, PWM, PPM Digital pulse code modulation- PCM (Introduction & quantization)
(5P, 4M)

Unit - 5 : Antenna :

Antenna parameters- Power gain radiation resistance, directivity, directional gain, radiation pattern, polarization, effective aperture, Effective length, front to back ratio. Types of Antenna- Half wave dipole (without mathematical derivation). Yagi and dish antenna. (8P, 6M)

Unit - 6 : Radio wave propagation :

Types of propagation, Ground wave propagation, Space wave propagation, Sky wave propagation (Ionospheric propagation), Propagation terms and definitions such as critical frequency, critical angle, virtual height, MUF, Skip distance.

(10P, 10M)

Unit - 7 : TV Systems

TV fundamentals, sound transmission, picture transmission, sound reception, picture reception.

Scanning- Horizontal, vertical and interlace scanning. Synchronizing and blanking pulses, composite video signal. Color picture tube – schematic diagram with three electron gun, electron gun arguments; type of color screen, Trinitron color picture tube. Simplified block diagram of color TV receiver, function of each block. Principle of Remote Control (Block diagram Only)

(30P, 30M)

Unit - 8 : Optical fiber Communication :-

Principle of Optical Fiber, Block diagram of optical fiber communication system, function of each block. Optical fiber construction & types. (Single mode, Multimode, Breded Index, Step Index), advantages of OFC.

(10P, 10M)

Unit - 9 : Satellite Communication :

Elements of satellite communication system. Geostationary satellite, Geostationary orbit. Uplink, downlink, TV broadcast via INTELSAT & DOMSAT. Area of application of satellite communication.

(6P, 5M)

References :

1. Electronic communication - Roddy & Coolen, 3rd edⁿ 1986, PHI Publication
2. Communication Electronics- Frenzel, McGraw Hill Publication
3. Electronic Communication System – Kennedy
4. Antena and wave propagation - K.D. Prasad, 3rd edⁿ 1996, Satya Prakashan
5. Monochrome & color TV – R.R. Gulati, 1999, New Age International
6. Communication Electronics – Deshpande & Deshpande, 1989, TMH Publication
7. Basic Electronics – D.C. Tayal, 2nd edⁿ 1998, Himalaya Publishing House
8. Electronic Communication – Sanjeeva Gupta, 1998, Khanna Publishers
9. Modern Satellite & cable TV manual – Manohar Lotia,
10. Principals of commu. Engg. – Umesh Sinha, Satya Prakashan
11. T.V. fundamentals – Anil Maini,
12. Basic Television & Video Systems – Grob, 5th edⁿ 1984, McGraw Hill Publication

T.Y.B.Sc. Electronics Paper - III
Microprocessor X86 Family

Objectives :

1. To learn the architecture of X86 family.
2. To learn the assembly language programming of 16 bit microprocessor.
3. To learn the interfacing of I/O devices with microprocessor.
4. To learn advance processors.

Unit : 1. The processor 8086 :

Register organisation of 8086 , Architecture, Pin diagram and its functions
Signal Descriptions of 8086, Physical memory organisation, General bus operation, I/O
Addressing capability, special processor activities, Minimum mode 8086 system and
timings, maximum mode 8086 system and timings .

(18P, 18M)

Unit : 2. 8086 Instruction set and Assembler directives:

Machine language instruction formats, Addressing modes of 8086 ,
Instruction set of 8086 , Assembler directives and operators.

(18P, 18M)

Unit : 3. Assembly Language Programming with 8086 :

Few machine level programs , machine coding the programs , Programming
with an assembler , Assembly Language programs.

(14P, 14M)

Unit : 4. Special architectural features and related programming :

Introduction to stack, Stack structure of 8086 , Interrupts and interrupt service
routines , Interrupt cycle of 8086, NMI and maskable interrupt, interrupt
programming , Macros.

(12P, 12 M)

Unit : 5. 32-bit processors :

Salient features of 80386 DX , Architecture and signal description of 80386 ,
Register organisation of 80386, addressing modes, datatypes of 80386, real address
mode of 80386 ,protected mode of 80386, segmentation paging Enhanced instruction
of 80386.

(20P, 20M)

Unit : 6.Recent advances in microprocessor architectures:

Salient features of 80586(PENTIUM), system architecture, MMX, Intel MMX architecture , MMX data types. (8P, 8M)

Unit : 7. I/O Interfaces:

Serial Communication interface, asynchronous and synchronous, communication, physical communication standards, programmable communication interface 8251, parallel communication. 8255 PPI(programmable peripheral interface)

(14P, 10M)

References :

1. Advanced microprocessors and peripherals (Architecture, Programming and Interfacing)- A.K.Ray, K.M. Bhurchandi, TMH Publication
2. Microprocessor system : 8086 / 8088 family. (Architecture, Programming and design) - Yu cheng Liu and G.A. Gibson 2nd edⁿ 2001, PHI Publication
3. Microprocessor and Interfacing - D. Hall, 1995, TMH Publication
4. The 8088 and 8086 microprocessors (Programming, interfacing, Software,Hardware and applications) - Walter A. Triebel, Autar singh.

T.Y.B.Sc. Electronics Paper - IV
Programming in "C"

Objectives :

1. To learn "C" as high level programming language.
2. Development of simple programs in "C" language.
3. To develop an Idea of Graphics using "C" language.
4. To understand file handling mechanism.

Programming in 'C'

Unit - 1. Introduction :

Block diagram of a simple computer (description of each block), concepts of Hardware and Software [System Software and User's software(HLL and LLL)], concept of Operating System software, Explanation of the concepts of compiler and Linker Software with diagrams. (3P, 3M)

Unit - 2. Introduction to C-language :

Importance of C-language, sample C programs, executing a C program (flow diagram only), character set, ANSI C keyboards, Variables, data type, type declaration of variables,

C- Operators :- Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment And Decrement Operators, Conditional Operators, Bit Wise Operators, Special Operators.

Evaluation of expressions, precedence (hierarchy) of arithmetic operators, type conversions in expressions, Operator precedence and Associativity, Mathematical functions. (8P, 10M)

Unit - 3. Input and Output operations :

Reading a character, Writing a character, Formatted input, Formatted output. (8P, 8M)

Unit - 4. Decision making and branching :

The simple if statement, The if --else statement, Nesting of if--else statement, The else--- if ladder, The SWITCH statement, The? ; Operator, The goto statement. (10P, 10M)

Unit - 5. Decision Making and looping :

The while statement, The do statement, the for statement, jumps in loops. (10P, 10M)

Unit - 6. Arrays and handling of strings :

One dimensional arrays, Two-dimensional arrays, Multidimensional arrays.

Declaring and initializing string. Declaring and initializing string variables, Reading strings from terminals, Writing strings to screen, putting strings together, String handling functions, Table of string

(12P, 12M)

Units - 7. User defined functions :

Need for user defined functions, The form of C function Return values, Calling a function , Category of functions, Nesting functions , recursion functions with arrays.

(12P, 10M)

Unit - 8. Structures and Unions :

Structure definition, Structure initialization, Arrays structures, Arrays within structures, Structures within Structure Structures and functions Unions .

(12P, 10M)

Unit - 9. Pointers :

Understanding Pointers, Declaring and initializing pointers, Pointer expressions, pointers and Arrays , Pointers and functions, pointers and structures.

(12P, 10M)

Unit - 10. File management in "C" :

Defining and Opening a file, Closing a file, input and output operations on files, Error handling during I/O operations, Random access to files, Command line arguments, [i.e. Functions- fopen(), fclose(), getc(), putc(), fprintf(), fscanf(), getw(), putw(), fseek(), ftell(), ewind()]

The Preprocessors - Macro substitution, File inclusion, compiler control directives. [#define, #undef, #include, #ifdef, #ifndef, #if, #else]

(12P, 10M)

Unit - 11. Graphics :

initgraph(), closegraph(), putpixel() ; line() ,circle() , ellipse(), arc(), rectangle(), with program examples.

(5P, 7M)

References:

- | | |
|-------------------------------|---|
| 1. Programming in ANSI C | - E Balgurusamy, 2 nd ed ⁿ 1989, TMH Publication |
| 2. Programming in C | - Stephen Kochen, |
| 3. The C programming Language | - Kerninghan and Rithchie, 2 nd ed ⁿ 1999,
PHI Publication |
| 4. Let us C | - Yeshwant Kanetkar, 3 rd ed ⁿ 1999,
BPB Publication |

T.Y.B.Sc. Electronics Paper – V

Industrial and Power Electronics

Objectives :

1. To have an idea about Industrial Applications of Semiconductor Devices.
2. To develop the ideas how the semiconductor devices can be used to control various operations in industries as well as the domestic applications.

Unit - 1. Power Semiconductor Devices :

Construction details, symbols, working, principle, I-V Characteristics of following devices : SCR, Diac, Triac, GTO, Light activated, silicon Controlled Rectifier, PUT, Silicon Controlled Switch (SCS).

Series & Parallel Operations of SCR, List of applications of SCR. (10 P, 10 M)

Unit - 2. Thyristor Ratings & Protection :

Ratings:

Latching Current, Holding Current, dv/dt & di/dt rating, I^2t rating, surge current rating, Junction temperature & Thermal resistance.

Protection:

Introduction, Over voltage & protection, dv/dt protection, Snubber circuit (Designing not expected), di/dt protection & its calculation. Over voltage protection by Selenium Diodes & Metal Oxide Varistors, Over current protection, Fuse & Electronic Crowbar over current protection.

(10 P, 8 M)

Unit - 3. Turn on & Turn off circuit for SCR :

Introduction to methods of Triggering (Gate triggering, Thermal triggering, Radiation triggering, Voltage triggering) Types of Gate triggering: - Pulse Triggering using UJT, BJT. Introduction to Turn on circuit- Natural & Forced Commutation, types of Forced Commutation (all classes).

(10 P, 10 M)

Unit - 4. Controlled Rectification :

Introduction, Single phase half-wave controlled rectifier using resistive load, Single phase half-wave rectifier using Inductive Load, Single phase half-wave rectifier with inductive load & free wheeling diode.

Single phase full-wave controlled rectifier with resistive load, Single phase full-wave controlled rectifier with inductive load, Single phase full wave controlled converter with free wheeling diode.

(12 P, 10 M)

Unit - 5. Inverters & Converters :

Introduction, Industrial applications, types of inverter, single phase- Bridge inverter, single phase Center Tapped inverter, series inverter.
Converters (choppers): - Introduction, principle of step down chopper (variable frequency & constant frequency control), step up chopper; chopper classification, chopper configuration, Two quadrant chopper (without mathematical analysis), four quadrant chopper.

(12 P, 12 M)

Unit - 6. Electric Welding :

Introduction, Classification, Resistance welding, Types of resistance welding- Spot welding, Butt welding, Seam welding & projection welding. Electric Arc Welding: - DC welding set, AC welding set, Metal Arc welding.

Electronic control in resistance welding: - Ignition contactor, Heat Control circuit, AC Timer, Non-synchronous weld timer.

Comparison between resistance & electric arc welding, comparison between AC & DC welding. (10P,10 M)

Unit - 7. High frequency heating :

Different types of heating- principle & theory of induction heating, merits & applications of inductive heating, principle & theory of dielectric heating.

(8 P, 8 M)

Unit - 8. SCR Controlled DC Motors :

DC Motor : principle, working, back E.M.F. & its significance, voltage equation & power equation, condition for maximum power, types of DC motor, Armature & shaft torque of DC motor, Break Horse Power (BHP), speed of DC motor, speed relations & regulations, Losses in DC motor, Efficiency of DC motor Applications of DC motor (list only).

Necessity of speed control & its method- speed control of DC motor by controlled rectifier, speed regulation by armature voltage control.

(20 P, 20 M)

Unit - 9. Industrial Application of SCR :

Uninterruptable power supplies, static circuit breaker, over voltage protection, simple battery charger, automatic battery charger, low voltage flasher, fan regulator using Triac, Emergency light system.

(12 P, 12 M)

References :

- 1 A Text Book on Power Electronics - H.C. Rai Galgotia Publication ,
- 2 Power Electronics - H.C. Rai, 3rd edⁿ 1999 Galgotia Publication
- 3 Industrial Electronics - G.K. Mithal, 18th edⁿ 1998, Khanna Publishers
- 4 Electrical Engineering & Electronics - V.K. Mehta, 1st edⁿ 1999, S.Chand & Company LTD.
- 5 Text Book of Industrial Electronics - Joshi, Rao, Sutrave, 2nd edⁿ 1998, Nirali Prakashan
- 6 Thyristor & Their Applications - M.Ramamoorthy, 2nd edⁿ 1999, EWP

T.Y.B.Sc. Electronics Paper - VI
Consumer Electronics and Microcontroller

Objectives :

1. To study principles required for designing consumer products.
2. Understanding of modern communication tools like Internet, E-mail etc.
3. To provide the knowledge of Microcontroller based systems

Consumer Electronics

Unit - 1 : Transducers :

Classification, active & passive Transducers, thermoelectrical Transducers-thermistor, thermocouple, Photo electrical transducer photo cell, photo voltaic (Solar cell), idea of opto-couple: Optical emitters & Optical sensor, microphone & Loudspeaker as an electroacoustic transducer. (8 P, 8 M)

Unit - 2 : Microphone, Loud speakers & Music Systems :

Microphone : Characteristics of microphone, different types of microphones- dynamic & carbon microphones (principle, construction, working and characteristics).

Loudspeaker : Horn type, Multiway speaker system (Woofers & Tweeters),

Player

(10 P, 12 M)

Unit - 3 : P.A. System :

Block diagram of P.A. system, typical P.A. installation planning (P.A. system for a public meeting in a public park and P.A. System for an auditorium having a certain capacity) (8 P, 8 M)

Unit - 4 : Telephone system :

Telephone set, working of phone set, telephone exchange, Initiating call, dialing a no., pulse dialing and tone dialing, signal to / from exchange, dial tone, dial signal and engage signal, making connection, answering call, conversion, ending call. Modems, telex, fax, PBX, PABX, transmitter and receiver, wireless phone system-cordless telephone basic unit, portable unit.

Mobile telephone: base unit, mobile unit, home area and roaming, limitation of conventional mobile system. Cellular mobile telephone services : basic concept, network structure, cell site, MTSO, mobile units, using a cellular telephone.

(16 P, 16 M)

Unit 5 : E-mail and Internet :

Concept of World Wide Web (WWW), concept of surfing, searching by WWW. Basic concept of E-mail, addressing, Newsgroup, Newsgroup addressing, Internet, chat, chatting, voice e-mail and video e-mail. Concept of Internet, the hi-tech network, e-mailing list, Internet accounts, browsers.

(10 P, 6 M)

Microcontroller

Unit - 6. Introduction to microcomputers:

- Basic component- CPU, memory, input/output device, buses.
- Microprocessor Microcontrollers Comparison of microprocessor & microcontrollers. A microcontroller survey. (6 P, 6 M)

Unit - 7. Microcontroller (the 8051) Architecture :

Ø 8051 Microcontroller hardware, Block diagram, CPU registers, Flags & program status word (PSW). Program counter & data pointer. Special function registers, The stack & stack pointers, Internal RAM/ROM, Oscillator & clock.

Ø Input/output pin5, port & circuits-port 0,1,2&3.

External memory, Counter & timers, Serial data Input/output, Interrupts. (16 P, 14 M)

Unit - 8 Basic assembly language programming concepts:

Ø Concept of programming, Problem definition, identification of input & outputs. Development of Algorithmic & flowcharts, Program coding Debugging & testing, Documentation, Concepts of language levels, Source program & object program, Assemblers, compiler & simulators. Classification of instructions, Addressing mode, Data transfer instructions. Arithmetic instructions, Logical instructions, Jump & call instructions.

(16 P, 16 M)

Unit - 9 : Programming :

Simple data transfer program, Arithmetic & Logical programs, Simple program loops, Code conversions etc. (10 P, 10 M)

Unit - 10 : Interfacing :

Interfacing of simple Switch and LED with Microcontroller. (4P,4M)

References: Consumer Electronics

1. Mobile cellular communication - Way Lee, 2nd edⁿ 1985, McGraw Hill Publ.
2. Electrical and electronic measurements and instrumentation - A.K. Sawhney.
3. Audio and Video systems - R.G. Gupta, 1998, TMH Publication
4. Modern sound reproduction - Olson
5. Mobile cellular telecommunications analog and digital system - Lee
6. Modern CD player servicing manual - Manohar Lotia, BPB Publication
7. Internet in easy steps - Geoff Preston
8. Modern telephone and cordless servicing - Manohar Lotia, 1st edⁿ 1997, BPB
9. Television - Gulati, New Age International.

Microcontroller

1. The 8051 Microcontrollers Architecture, programming & Applications - Kenneth J. Ayala, 2nd edⁿ 1996, Penram International Publ.
2. The 8051 Microcontrollers & embedded systems.
- Mohammad Ali Mazidi, & Janice Gillespie Mazidi

T.Y.B.Sc. Electronics Paper - VII
Practical - I

Group A : (Any Eight)

1. Design, build and test crystal oscillator using transistor / IC.
2. To study digital multiplexing using IC 555 and IC 7400.
3. To determine the conductivity of a given sample using Four-Probe Method
4. To determine the Energy Gap of a semiconductor diode. .
5. Build and test DC to DC converter using transistors / ICS.
6. Build and test SMPS.
7. Determine the Hall coefficient of a given Sample.
8. Design and built T to F convertor using IC555/ IC741.
9. Design, build and test Pulse Amplitude Modulation (PAM) using IC555, IC 741 and Diode.
10. Study of Public Address System and directional characteristics of Microphone.
11. Study of directional characteristics of an antenna.
12. Study of optocoupler using LDR/Photo diode and IC-741.

Group B: (Any Eight)

1. Build and Study Emergency Light System.
2. To Study a Triac / SCR power control circuit used to control speed of a fan or Dimmer.
3. Build and Study Simple Battery Charger for a given voltage.
4. Build and Study Time delay circuit using SCR and UJT.
5. Build the circuit and observe the waveforms of half wave controlled rectifier using SCR.
6. Build and Study over voltage protection circuit for a given voltage.
7. Study of use of photoconductive Cell / LDR to trigger SCR.
8. To measure latching current and holding current for a given SCR.
9. Use of IC tester to Study ICs like 7489, 74026,.....etc.
10. To Study Amplitude Modulation for percentage Modulation and Detection using diode.
1. Build and Test PWM and PPM using IC 555.
2. Fault finding of B/W TV receiver.

**T.Y.B.Sc. Electronics Paper - VIII
Practical - II**

**Microprocessor 8086 Assembly Language Programming and
"C" - language programming**

A. Microprocessor 8086 Assembly Language programming :
Group A: (Any Eight)

1. To read a single digit hexadecimal number and multiply by 8 without MUL instruction (Register contents can be shown using DEBUG)
2. To display A to z with one space and ten characters in one line, and 0 to 9 with one space on the next line.
3. To display complete character set with 10 characters on one line.
4. To change Lower Case to Upper Case/ Upper Case to Lower Case Alphabets.
5. To reverse the input string of characters.
6. To find largest / smallest from a set of entered numbers (0 to 9 and A to F only, two digit data.)
7. To find sum of numbers entered (0 to 9 , and A to F only. two digit data.)
8. To enter a decimal number and to print it's binary equivalent.
9. Sorting of an array (Ascending / Descending)
10. To generate n fibonacci numbers.
11. To find factorial of a given number.
12. To read sequence of ones and zeroes representing 4 bit binary number and display its hex equivalent
13. To read to string sending with carriage returns and compare those for Equality, displaying proper message.
14. Line drawing on the screen.
15. Square drawing on the screen.
16. Interfacing of relay.
17. Interfacing of stepper motor.

B. 'C'- Language programming
Group B : (Any eight)

1. Write a program to generate n prime numbers starting from any prime number p.
2. Write a program to generate the first n Fibonacci numbers using array.
3. Write a program (i) to get sum of digits ,(ii) to reverse digits, of given number n.
4. Write a main program and a function subprogram to find the GCD of two nonnegative integers, m and n.

5. Write a main program and a function subprogram to sort an array of integers into Ascending and Descending order.
6. Write a program to calculate factorials of positive n integer numbers using Recursive function.
7. Write program to define a structure type, struct personal, that would contain person name, date of joining and salary. Using this structure, write a program to read this information for n number of persons and print the same on the screen
8. Write a main program and a function to look up a word inside dictionary.
9. Write a program to enter number of elements in an array. Using pointer print the value and address of each element. Compute the sum of all elements in an array
10. Write a program using pointers to determine the length of a character string.
11. Write a program to illustrate the use of structure pointers.
12. Write a program to read data from the keyboard, write it to a file called INPUT, again read the same data from the INPUT file and display it on the screen.
13. Write a program to copy one file to another file to another file using function getc and putc.
14. Write a program to draw concentric circles on the screen with red back ground.
15. Write program to draw ellipse in a rectangle on the screen with some colored background .

T.Y.B.Sc. Electronics Paper - IX
Practical - III

Project & Industrial visit

Note :

1 **Project carries 90 marks.**

A visit to an **Electronic Industry** is compulsory & its report should be submitted at the time of the examination. **10 marks** are reserved for industrial visit.

2 An **internet facility** should be made available in electronics laboratory.

