B.Sc First Year

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
B. Sc. First Semester
ELECTRONICS
Paper – I Course: ELE – 101
(effective from June 2013)

Paper – I (ELE – 101): Network Theorems and Semiconductor Devices
Marks: 50 Credits:03 Periods : 45

1. Components and Network Theorems : (12) [**0.8credits**]
Active & passive elements, Resistors, Capacitors, Inductors, Transformers, Relays and Fuses {classification, specification & Applications}, Voltage divider theorem, current divider theorem, ideal Constant voltage source, Ideal constant current source, superposition theorem, Thevenin's theorem, maximum power theorem,

2.Diodes : (09) [**0.6credits**]
P-N junction Diode, Biasing a semiconductor diode, Static and Dynamic resistance of a diode, breakdown of PN junction, ideal diode, Special diodes(Zener diode, Tunnel diode, Varactor diode, Light Emitting diode and Photodiode)

3. Transistors: (12) [**0.8credits**]
Transistor, transistor action, transistor symbols, transistor configurations, characteristics of transistor in common base, common emitter, common collector configurations, comparison of CE,CB and CC configuration, transistor current gains α and β, relation between α and β, Junction field effect transistor, Static characteristics of JFET, JFET characteristics with external bias, transfer characteristics, small signal JFET parameters, MOSFET.

4.Power supplies: (12) [**0.8credits**]
Block diagram of Regulated Power Supply, Half wave rectifier, efficiency of HWR, Full wave rectifier, Bridge rectifier, efficiency of FWR, ripple factor, types of filter circuits, Zener diode as voltage regulator, transistor series voltage regulator, fixed positive linear regulators, fixed negative linear voltage regulators.

Text Books:
1. Electrical Technology – B.L.Theraja (S. Chand 2004) (Chp.1)

2. Semiconductor Electronics – A.K.Sharma New age international 1996(Chp.2)
3. Principle of electronics – V.K.Mehta (S. Chand and Co. 2004) (Chp.2,3 and 4)
4. Basic Electronics (solid stste) – B L Theraja (S. Chand and Co. 2012) (Chp.1, 2,3 and 4)
5. Basic Electronics by Grobe.

B. Sc. First Semester Subject: ELECTRONICS
Paper – II Course: ELE – 102
(effective from June 2013)
Paper – II (ELE – 102): Digital Electronics – I
Marks: 50 Credits:03 Periods : 45

1. Number System: (15) [**1 credits**]
Number System: Decimal, Binary, Hexadecimal Number Systems and their inter conversions , Binary arithmetic (addition, subtraction, multiplication and division), 1's and 2's compliment method for binary subtraction, Hexadecimal addition and subtraction, Binary Codes (8421 (BCD) code, Gray code, Excess-3 code), BCD addition and subtraction, Excess-3 addition and subtraction, ASCII Code

2. Logic gates: (09) [**0.6credits**]
Positive and negative logic, Logic Gates (NOT gate, AND gate, OR gate, NAND gate, NOR gate) using diodes & transistors, Ex-OR gate, Ex-NOR gate.

3. Boolean algebra: (09) [**0.6 credits**]
Boolean Operations, Rules and laws of Boolean algebra, DeMorgan's theorems, minterms, maxterms, SOP and POS form of Boolean expressions, Simplification of Boolean Expressions, Karnaugh map [K-map] (up to four variables only)

4. Combinational logic circuits: (12) [**0.8 credits**]
NAND and NOR gate as universal building blocks, Half adder, Full adder, Half subtractor, full subtractor, 4 bit parallel adder and subtractor, 2's complement adder /subtractor, 3 bit binary decoder, decimal to BCD encoder, 8 to 1 multiplexer, 1 to 8 demultiplexer.

Books Recommended:

1. Digital Fundamentals – Thomas L Floyd, Universal Book Stall New Delhi
2. Digital Electronics and Microcomputers – R.K.Gaur
3. Digital Analog Techniques – Navneth, Kale and Gokhale, Kitab Mahal
4. Digital Electronics with Practical Approach – G N Shinde, Shivani Publications Nanded
5. Digital Principles and Circuits – C B Agarwal, Himalaya Publishing House.

B. Sc. Second Semester
ELECTRONICS
Paper – III Course: ELE – 201
(effective from June 2013)
Paper – III (ELE – 201): Amplifiers
Marks: 100 Credits:03 Periods : 45

1. Bias for Transistor Amplifiers: (12) [**0.8credits**]
Transistor load line analysis, Operating point, Inherent variation of transistor parameters, Stabilisation, essentials of transistor biasing circuit, stability factor, methods of transistor biasing, base resistor method, voltage divider bias method.

2. Small signal Amplifiers: (12) [**0.8credits**]
Two port network, h-parameter equivalent circuit, equivalent circuit for BJT, transconductance model, CE amplifier, CB amplifier, emitter follower circuit, equivalent circuit for JFET, Common Source amplifier, source follower amplifier

3. Feedback Amplifier: (12) [**0.8credits**]
An amplifier black box with feedback, stabilization of gain by negative feedback, reduction of nonlinear distortion by negative feedback, , effect of feedback on output resistance, effect of feedback on input resistance, voltage series feedback.

4. Multistage transistor amplifier: (09) [**0.6credits**]
Multistage transistor amplifier, important terms, RC coupled transistor amplifier, direct coupled amplifier.

Text Books :

1. Electronics fundamentals and applications–J.D.Ryder,5th ed. (Chp. 1, 2 and 3)
2. Principle of electronics - V.K.Mehta (S Chand and co. 2004)(Chp.1 and 4)

B.Sc. Second Semester
ELECTRONICS
Paper – VI Course: ELE – 202
(effective from June 2013)
Paper – VI (ELE – 202): Digital Electronics – II
Marks: 100 Credits:03 Periods : 45

1. Flip-Flops: (9 periods) [**0.6 credits**]
flip flops (SR, D, JK and T) [using gates], Methods of triggering flip flops, Edge triggered flip flops (SR, D, JK and T), Asynchronous inputs, Master slave JK flip flop, Operating characteristics.

2. Counters: (9 periods) [**0.6 credits**]
Concept of counter, Asynchronous Counters (three and four bit), Synchronous Counters (three and four bit), decade Counter (asynchronous), Up/Down Synchronous Counter (three bit only)

3.Shift Registers: (9 periods) [**0.6 credits**]
Shift register functions, Serial In – Serial Out Shift Register, Serial In – Parallel Out Shift Register, Parallel In – Serial Out Shift Register, Parallel In – Parallel Out Shift Register, Bidirectional Shift Register, Ring Counter, Buffer Register

4. Memories: (9 periods) [**0.6 credits**]
Memory Concept, Read Only Memory (ROM), Programmable ROMs (PROMs & EPROMs), Random Access (Read / Write) Memories (RAMs)

5. D/A and A/D converters: (9 periods) [**0.6 credits**]
R-2R Ladder type D/A converter, DAC Characteristics (Monotonicity, Resolution, Accuracy and Setting Time), Successive approximation A/D converter, Dual slope A/D converter

Books Recommended:

1. Digital Fundamentals – Thomas L Floyd, Universal Book Stall New Delhi
2. Digital Electronics and Microcomputers – R K Gaur
3. Digital Analog Techniques – Navneeth, Kale and Gokhale, Kitab Mahal
6. Digital Electronics with Practical Approach – G N Shinde, Shivani Publications
Nanded
7. Digital Principles and Circuits – C B Agarwal, Himalaya Publishing House

ELECTRONICS
Paper – V Course: ELE – 103
(effective from June 2013)
Paper – V (ELE – 103): Experiments based on paper I & II
Marks: 50 Credits: 1.5

Every candidate appearing for examination must produce journal showing that he/she has completed 06 experiments during academic year. The journal must be certified at the end of the year by Head of the Department.

1. Study of PN junction diode characteristics, determination of ac and dc resistance
2. Study of zener diode characteristics, determination of V_Z, I_Z, Z_Z.
3. Study of transistor characteristics in CE configuration, determination of α.
4. Study of JFET characteristics, determination of parameters.
5. Built and study of Full wave rectifier
6. Built and study shunt regulator using zener diode, line and load regulation
7. Built and study power supply with capacitor filter
8. Built and Built and study NOT, OR, & AND gates using Diodes and Transistor/ 74XX.
9. Built and Built and study NAND & NOR gates using Diodes and Transistor/ 74XX.
10. Built and Built and study basic gates using NAND/ NOR gates.
11. Built and study of Half adder using gates.
12. Built and study of Half subtractor using gates.

ELECTRONICS
Paper – VI Course: ELE – 204
(effective from June 2013)
Paper – VI (ELE – 203): Experiments based on paper II & IV
Marks: 50 Credits: 1.5

Every candidate appearing for examination must produce journal showing that he/she has completed 04 experiments during academic year. The journal must be certified at the end of the year by Head of the Department.

1. Built and study CE amplifier, plot the frequency response curve and find 3
dB bandwidth
2. Built and study common source FET amplifier, plot the frequency response
curve and find 3 dB bandwidth
3. Built and study current series feedback amplifier, plot frequency response
curve with and without feedback
4. Built and study two stage RC coupled CE amplifier, plot the frequency response curve and find 3 dB bandwidth
5. Built and study JK, T and D- Flip-Flops using IC 7476
6. Built and study 4-bit binary parallel adder / subtractor using IC 7483
7. Built and study MOD 16 Asynchronous binary UP counter
8. Built and study binary decade counter IC 7490
9. Built and study D/A converter using R-2R ladder network

The students should built a mini project and submit it at the time of
examination along with project report. The project will carry 20 marks in the examination.

B.Sc Second Year

B. Sc. Third Semester
Subject: ELECTRONICS
Course: ELE-301 Paper – IX
(Effective from June 2014)
Title: OPERATIONAL AMPLIFIERS
Marks: 50 Periods: 45 Credits: 03

1. Operational Amplifier: (15 periods) [**1.0 credits**]
Differential amplifier, Dual input balanced output differential amplifier, block diagram of typical Op-Amp, schematic symbol, interpreting data sheet, the ideal Op-Amp, equivalent circuit of an Op-Amp, Op-Amp Parameters-Input Impedance, Out Impedance, Input Offset Voltage, Open loop Voltage Gain, input Bias Current, Slew Rate[definitions only], open loop Op-Amp configurations.

2. Operational Amplifier Applications: (15 periods) [**1.0 credits**]
Voltage series feedback amplifier, Voltage shunt feedback amplifier, DC and AC amplifiers, summing, scaling and averaging amplifiers, voltage to current converter (Low voltage DC voltmeter and low voltage AC voltmeter only) , integrator, differentiator, basic comparator, zero-crossing detector, Schmitt trigger.

3.Oscillators: (09 periods) [**0.6 credits**]
Oscillator principle, oscillator types, frequency stability, phase shift oscillator, Wien Bridge oscillator, square wave generator, triangular wave generator, saw tooth wave generator, voltage controlled oscillator.

4.The 555 Timer: (06 periods) [**0.4 credits**]
The 555 as monostable multivibrator, monostable multivibrator applications, The 555 as an astable multivibrator, astable multivibrator applications, Free running ramp generator.

Books Recommended:

1. Op-Amps & Linear Integrated Circuits (Second Edition) [Chapters 1 to 4]
Ramakant Gaikwad, Prentice Hall of India
2.Electronic Fundamaentals and Applications (Fifth edition) [Chapters 1and 2.]
John D Ryder Prentice Hall of India
3. Linear Integrated Circuits D Roy Choudhry & Shail B Jain New Age International Publishing
4. Electronic Devices (Sixth Edition) Floyd Pearson Education

5. Op Amps & Linear Integrated Circuits James M Fiore Thomson Learning
6. Integrated Circuits K R Botkar, Khanna Publishers, New Delhi.

Course: ELE-302 Paper – X (A)
(Effective from June 2014)
Title: 8086 Microprocessor
Marks: 50 Periods: 45 Credits: 03

1. The 8086 Microprocessor: (15 periods) [**1.0 credits**]
Generation of Microprocessor,registered organization of 8086,features of 8086,Pin diagram (Signal Description),CPU architecture,Physical memory organization, general bus operation, I / O processing capability, special processor activities, minimum mode 8086 system and timing, maximum mode 8086 system and timing

2. The 8086 Microprocessor Instruction set: (15 periods) [**1.0 credits**]
Machine language instruction formats, addressing modes of 8086, Data copy / transfer instructions, Arithmetic instructions ,logical instruction, Branch instructions, loop instructions, machine control instructions, Flag manipulation instructions, Shift and rotate instructions, String instructions

3. Assembly language programming : (15 periods) [**1.0 credits**]
Assembly language example programs- addition of two numbers, addition of a series of 8 bit numbers, find the largest number from given array of 8 bit numbers, find out odd and even numbers from the given series of hexadecimal numbers, find out positive numbers and negative numbers from a given series of signed numbers, move a string of data from one location to other location, arrange given array of 8 bit numbers in ascending order, arrange given array of 8 bit numbers in descending order, one byte BCD addition, factorial of a 8 bit number , average of block of 8 / 16 bit data.

Books Recommended:

1. Advanced Microprocessors and Peripherals (Second Edition) [Chapters 1 to 3]
– A K Ray & K M Bhurchandi Tata McGraw Hill 2009
2. The INTEL Microprocessors 8086 /8088, 80186/80188, 80286, 80386, 80486,
Pentium and Pentium Processor –Barry B. Brey Printice-Hall INDIA
3. Microprocessors – S. K. Gupta Pragati Prakashan Meerut
4. Microprocessors – II –A. P. Godse Technical Publications PUNE

Subject: ELECTRONICS

Course: ELE-302 Paper – X (B)

(Effective from June 2014)

Title: 8085 Microprocessor – I

Marks: 50 Periods: 45 Credits: 03

1. Microprocessor Architecture and Organisation: (09 periods) [**0.6 credits**]

The ideal microprocessor, architecture of microprocessor, organisation of microprocessor, features of Intel 8085, 8085 functional pin description, 8085 CPU architecture

2. The Configuration: (09 periods) [**0.6 credits**]

Demultiplexing $AD_7 – AD_0$, generation of control signals, 8085 clock circuit, basic 8085 microprocessor unit, 8085 instruction fetching and execution operation

3. 8085 Instruction Set : (12 periods) [**0.8 credits**]

Instruction formats, addressing modes, op-code format, classification of instruction set, instruction set

4. 8085 Programming: (15 periods) [**1.0 credits**]

Programming technique, simple programs, concept of looping,

Books Recommended:

1. 8 - bit Microprocessors System Design – V J Vibhte & P B Borole [Chapters 1 to 4] Technova Publications, PUNE
2. Microprocessor Architecture, Programming, and Applications with the **8085**
(5th Edition) –Ramesh S. Gaonkar Penram International Publishing.
3. Microprocessors –I –A. P. Godse Technical Publications PUNE

Subject: ELECTRONICS

Course: ELE-303 Paper – XI (Practical) [**1.5 credits**]

(Effective from June 2014)

Every candidate appearing for examination must produce journal showing that he/she has completed 07 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments (Marks 50)

1. Study of Op – Amp as a non inverting amplifier.
2. Study of Op – Amp as an inverting amplifier.
3. Study of Op – Amp as an inverting adder.
4. Study of Op – Amp as an inverting subtractor.
5. Study of Op – Amp as an integrator.
6. Study of Op – Amp as a differentiator.
7. Study of Op – Amp as a Schmitt trigger.
8. Study of Op – Amp as an analog computer to solve simple equation.
9. Study of Op – Amp as Low voltage DC voltmeter
10. Built and study Wien Bridge oscillator using Op – Amp.
11. Built and study phase shift oscillator using Op – Amp.

Course: ELE-304 Paper – XII [A] [1.5 credits]
(Practicals based on 8086)
(Effective from June 2014)

Every candidate appearing for examination must produce journal showing that he/she has completed 07 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments (Marks 50)

1. Assembly language program to find sum of 8 bit numbers.
2. Assembly language program to find sum of 8 bit numbers in a given array.
3. Assembly language program to find out positive numbers and negative numbers from a given series of signed numbers.
4. Assembly language program to find average of block of data containing N numbers.
5. Assembly language program to determine whether the number is even or odd. If the number is odd, copy 00 to ML ------- otherwise copy EE.
6. Assembly language program to move a string of data from one location to other location.
7. Assembly language program to find a factorial of 8 bit number.
8. Assembly language program to find square root of a 16 bit number.
9. Assembly language program to perform one byte BCD addition.
10. Assembly language program to arrange given array of 8 bit elements in ascending order.
11. Assembly language program to arrange given array of 16 bit elements in descending order.
12. Assembly language program to add two multi-byte numbers and store the result as a third number.

Course: ELE-304 Paper – XII [B] [1.5 credits]
(Practicals based on 8085)
(Effective from June 2014)

Every candidate appearing for examination must produce journal showing that he/she has completed 07 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments (Marks 50)

1. Assembly language program to find sum of two 8 bit numbers.
2. Assembly language program to find sum of 8 bit numbers in a given array.
3. Assembly language program to find difference of two given numbers.
4. Assembly language program to find largest number in a block of data containing N numbers.
5. Assembly language program to find smallest number in a block of data containing N numbers.
6. Assembly language program to move a block of data from one location to other location.
7. Assembly language program to find a factorial of 8 bit number.
8. Assembly language program to find sum of two 16 bit numbers.
9. Assembly language program to perform one byte BCD addition.
10. Assembly language program to multiply two single byte numbers

Course: ELE-401 Paper - XIII
(Effective from June 2014)
Title: COMMUNICATION ELECTRONICS
Marks: 50 Periods: 45 Credits: 03

1. Types of Modulation: (15 periods) [**1.0 credits**]
Amplitude modulation, expression for amplitude modulated voltage, waveforms of amplitude modulated voltage, sidebands produced in amplitude modulated wave, Frequency modulation, expression for frequency modulated voltage, waveforms of frequency modulated voltage, sidebands produced in frequency modulated wave, Phase modulation, comparison of frequency modulated and phase modulated expressions

2. Pulse Modulation: (06 periods) [**0.4 credits**]
Pulse amplitude modulation, pulse code modulation, pulse frequency modulation, pulse position modulation, pulse width modulation

3. Modulation and Detection: (12 periods) [**0.8 credits**]
Amplitude modulation theory, Square Law modulation, class C linear diode detector, varactor diode frequency modulator, Armstrong modulator, phase discriminator, AM transmitter, Superheterodyne receiver

4. Digital Communication: (12 periods) [**0.8credits**]
Synchronization, Asynchronous transmission, Probability of error in base-band transmission, Matched filter, Bit timing recovery, Digital carrier system, amplitude shift keying, frequency shift keying, phase shift keying, differential phase shift keying

Books Recommended:
1) Electronics and Radio Engineering – M L Gupta (Chapters 1, 2 and 3) Dhanpat Rai & Sons
2) Electronic Communications [IV Edition] –Dennis Roddy & J Coolen, (Chapters 2, and 4) PHI Private Ltd. New Delhi
3) Advanced Electronic Communication Systems –Wayne Tomasi, PHI publication 2001.
4) Introduction to Telecommunication –A A Gokhale, Thomson Learning

Course: ELE – 402 Paper – XIV(A)
(Effective from June 2014)
Title: Microprocessor Interfacing
Marks: 50 Periods: 45 Credits: 03

1. Interfacing of memory and I/O (09 Periods) [**0.6 credits**]
Semiconductor memory interfacing, static RAM interfacing, dynamic RAM
interfacing, interfacing I/O ports

2. Programmable Input – Output 8255: (12 Periods) [**0.8 credits**]
Features of 8255,PIO 8255 pin diagram and architecture, modes of operation of 8255, Interfacing ADC, interfacing of DAC, stepper motor interfacing

3. Communication Interface: (12 Periods) [**0.8 credits**]
Features of 8251,Methods of data communication, architecture and signal description, operating modes, interfacing and programming of 8251

4. Programmable Interval Timer: (12 Periods) [**0.8 credits**]
Features of 8253,Pin diagram and architecture, control word, operating modes, programming and interfacing 8253.

Books Recommended:

1. Advanced Microprocessors and Peripherals (Second Edition) [chapters 1to 4]
– A K Ray & K M Bhurchandi Tata McGraw Hill 2009
2. The INTEL Microprocessors 8086 /8088, 80186/80188, 80286, 80386, 80486,
Pentium and Pentium Processor –Barry B. Brey Printice-Hall INDIA
3. Microprocessors – S. K. Gupta Pragati Prakashan Meerut
4. Microprocessors – II –A. P. Godse Technical Publications Pune

Course: ELE-402 Paper – XIV (B)
(Effective from June 2014)
Title: 8085 Microprocessor – II
Marks: 50 Periods: 45 Credits: 03

1. Instruction Timing and Operations: (12 periods) [**0.8 credits**]
Introduction to machine cycle, machine cycles, timing diagram, 8085 wait, hold and halt states, 8085 transition state diagram

2. Stack and Subroutine: (15 periods) [**1.0 credits**]
Stack, use of stack for programmer, advanced stack related instructions, use of stack by microprocessor subroutines, Call address and RET instructions, parameter passing techniques, subroutine documentation, conditional call and return instructions

3. I / O Data Transfer Techniques: (09 periods) [**0.6 credits**]
Microprocessor controlled transfer, hand shake I / O data transfer techniques

4. 8085 Interrupts : (09 periods) [**0.6credits**]
Interrupt system, types of interrupts, 8085 interrupt structure, interrupt logic control instructions, priority interrupt structures

Books Recommended:

1. 8 - bit Microprocessors System Design – V J Vibhte & P B Borole [Chapters 1 to 4] Technova Publications, PUNE
2. Microprocessor Architecture, Programming, and Applications with the **8085** (5th Edition) –Ramesh S. Gaonkar Penram International Publishing
3. Microprocessors –I –A. P. Godse Technical Publications PUNE

Course: ELE-403 Paper –XV (Practical) [1.5 credits]

(Effective from June 2014)

Every candidate appearing for examination must produce journal showing that he/she has completed 04 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

VII – A: Experiments (Marks 30)

1. Built and study astable multivibrator using IC 555.
2. Built and study monostable multivibrator using IC 555.
3. Built and study free running ramp generator.
4. Study of amplitude modulation using transistor.
5. Study of AM detector using diode.
6. Study of F M modulation using IC.
7. Study of F M detector using IC.
8. Study of Balance modulator.

VII – B: Project (Marks 20)

Every student should construct one project based on the syllabus of Third and Fourth Semester. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

Course: ELE-404 Paper – XVI [A] [1.5 credits]
(Practicals using 8086)
(Effective from June 2014)

Every candidate appearing for examination must produce journal showing that he/she has completed 04 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

VIII – A: Experiments (Marks 30)

1. Interface 8 LED and 8 switches & write ALP to display status of switch using 8255.
2. Write a program for 8 bit binary UP counter and implement it using 8255.
3. Write a program for 8 bit binary DOWN counter and implement it using 8255.
4. Write a program to acquire 8 – bit data from an ADC and implement it using 8255.
5. Interface Hex Key board and seven segment display to display key pressed on seven segment display.
6. Write ALP to generate triangular waveform of frequency 500 HZ using DAC 0800 with 8255 & 8086 microprocessor.
7. Design stepper motor controller and write an ALP to rotate shaft of stepper motor in clockwise direction (5 rotations) & anticlockwise direction (5 rotations).
8. Study of modes '0'of 8253.
9. Study of modes '1'of 8253.
10. Study of modes '2'of 8253.

VIII – B: Project (Marks 20)

Every student should construct one project based on the syllabus of Third and Fourth Semester. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

Course: ELE-404 Paper – XVI [B] [1.5 credits]
(Practicals based on 8085)
(Effective from June 2014)

Every candidate appearing for examination must produce journal showing that he/she has completed 04 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

VIII – A: Experiments (Marks 30)

1. Assembly language program to add first ten even hexadecimal numbers and store
the result in D register.
2. Assembly language program to find square of a single digit number.
3. Assembly language program to move a block of data from one location to other
location in reverse order.
4. Assembly language program to find positive numbers in an array of ten elements.
Store the result at -----.
5. Assembly language program to add two multi byte hex numbers. Each number
consists of four bytes.
6. Assembly language program to divide a number by another number. Store the
result in one register and remainder in another register.
7. Assembly language program to find first two highest numbers from a given array
of 16 numbers.
8. Assembly language program to arrange given array of 8 bit elements in ascending
order.
9. Assembly language program to arrange given array of 16 bit elements in descending order.

VIII – B: Project (Marks 20)

Every student should construct one project based on the syllabus of third and Fourth Semester. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

B.Sc Third Year

B. Sc. Fifth Semester
ELECTRONICS
Course: ELE-501 Paper – XVII
(Effective from June 2011)
Title: POWER ELECTRONICS
Marks: 50 Periods: 45

1.Thyristors (12)

Silicon Controlled Rectifiers { Construction, Operation, Equivalent Circuit,
Characteristics}; Unijunction Transistors, Diac, Triac, IGBTs

2. Detection Sensors (12)

Limit Switches, Proximity Detectors, Inductive Proximity Switches {Ports, Output Stages, Operation}: Capacitive Proximity Switches, Photoelectric Sensors, Methods of Detection, Operating Specifications, Sensor Interfacing { Electromagnetic Relays, Resistive Load, Inductive Load, Solid State Relay, Two Wire System}

3. D C Drives: (09)

DC Drive Fundamentals, Variable Voltage DC Drive, Motor Braking

4. A C Drives (12)

AC Drive Fundamentals, AC Drive System, Drive Controller Internal Circuitry, Circuit Operation of AC Drive, PWM Control Methods, Control Panel Inputs Drive functions, Inverter Self – Protection Function, Motor Braking,

Books Recommended

1. Industrial Electronics { Circuits, Instruments and Control Techniques} –
Terry Bartelt, DELMAR, Cengage Learning India Pvt. Ltd. Delhi, 2009
2. Introduction to Power Electronics – V Jagannathan, PHI, New Delhi, 2004
3. Power Electronics – M D Singh and K B Khanchandani,

Course: ELE-502 A Paper XVIII (A)
(Effective from June 2011)
Title: MICROCONTROLLER – I
Marks: 50 Periods: 45

1. 8051 Microcontroller (15)

Introduction, Microcontrollers and microprocessors, history of microcontrollers, embedded versus external memory devices, 8-bit and 16-bit
microcontrollers, CISC and RISC processors, Harvard and Von Neumann architecture, commercial microcontroller devices 8051 Pin Description, Connections, Parallel I/O Ports, Memory Organization

2. Addressing Modes and Instructions (09)

8051 Addressing Modes, MCS – 51 Instruction Set, 8051 Instructions and
Simple Programmes, Using Stack Pointer

3. Interrupts, Timer/ Counters and Serial Communication (09)

Interrupts, Interrupts in MCS – 51, Timers and Counters, Serial Communication

4. Applications of MCS – 51 (12)

Pin diagrams of 89C51 and 89C 2051, Applications of MCS – 51 and Atmel
89C51 and 89C2051 Microcontrollers, Square Wave Generation, Pulse Generation, Staircase Ramp Generation, Pulse Width Measurement

Books Recommended:

1. Microcontrollers [Theory and Applications] – Ajay Deshmukh, TMH, New
Delhi, 2009
2. The 8051 Microcontroller and Embeded system – M A Mazadi, J G Mazadi
and R D McKinlay, Pearson PHI, 2009
3. The 8051 Microcontroller – K J Ayala, DELMAR, Cengage Learning India
Pvt. Ltd. Delhi, 2008

Course: ELE-502B Paper XVIII (B)

(Effective from June 2011)

Title: 8085 INTERFACING – I

Marks: 50 Periods: 45

1. Semiconductor Memories and Interfacing (15)

Semiconductor Memories, Introduction to Memory Interfacing, Memory Organization, Using Decoder for Chip Select Logic, Interfacing Designs (Problem 1 to 5)

2. Programmable Peripheral Interface PPI – 8255 (15)

Intoduction, 8255 Functional Block Diagram, 8255 Initialization, I / O Operating Modes

3. Programmable Communication Interface – 8251 (15)

Introduction to 8251, Pin Description, 8251 Block Diagram and Functional Description, 8251 Control Word, 8251 Data Transfer Operation, Asynchronous Mode Transmission, Asynchronous Mode Receiver, Synchronous Mode Transmission, Synchronous Mode Reception, 8251 Status Word

Books Recommended:

1. 8 – Bit Microprocessor System Design – V J Vibhute and P B Borole, Technova Publications, Pune

2. Microprocessor Architechture, Programming and Applications with 8085 – Ramesh S Gaonkar, Penram International Publishing

Course: ELE-503 Paper XIX (Practicals)

(Effective from June 2011)

Practicals Based on Paper XVII

Every candidate appearing for examination must produce journal showing
that he/she has completed *Six* (06) experiments during the semester. The
journal must be certified at the end of the semester by The Head of the Department.

Experiments (Marks 50)

1. Study of SCR characteristics.
2. Study of UJTcharacteristics.
3. Study of DIACcharacteristics.
4. Study of TRIAC characteristics.
5. Study of IGBT characteristics.
6. Study of firing of two SCRs using one UJT for power control.
7. Study of Triac as light dimmer.
8. Half wave & full wave rectifier using SCR.
9. Diac operated temperature sensitive switch using thermister.
10. UJT relaxation oscillator.
11. Timer using SCR & UJT
12. Study of Inductive Switch.
13. Study of Capacitive Switch.

Course: ELE-504 A Paper XX (A) (Practicals)
(Effective from June 2011)
Practicals Based on Paper XVIII(A)

Every candidate appearing for examination must produce journal showing
that he/she has completed *Four* (04) experiments during the semester. The
journal must be certified at the end of the semester by The Head of the Department.

(A) Experiments (Marks 30)

1. Write a program to blink LED with 0.5 Hz frequency and implement it using Atmel 89C51.
2. Write a program for 8 – bit up counter and implement it using Atmel 89C51.
3. Write a program for 8 – bit binary down counter and implement it using
Atmel 89C51.
4. Write a program to interface a switch and 8 LEDs for binary up counter
when switch is closed and pause the counter when switch is open, implement it using Atmel 89C51.
5. Write a program to generate square waveforms using Atmel 89C51 and
implement it.
6. Write a program for pulse generation using Atmel 89C51 and implement it.
7. Write a program for pulse width measurement using Atmel 89C51 and
implement it.

(B) Project (Marks 20)

Every student should construct one *Suitable* project. He/she should submit
the project and project report thereon at the time of practical examination.
The project report must be certified at the end of the semester by The Head
of the Department.

Subject: ELECTRONICS

Course: ELE-504 B Paper XX (B) (Practicals)

(Effective from June 2011)

Practicals Based on Paper XVIII(A)

Every candidate appearing for examination must produce journal showing that he/she has completed *Four* (04) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

(A) Experiments (Marks 30)

1. Write an assembly language program (ALP) to interface 8 LEDs and 8 switches to display status of switch using 8255 and implement it.
2. Write an assembly language program (ALP) to interface Hex keyboard and seven segment display to display key pressed on SSD using 8255 and implement it.
3. Write an assembly language program (ALP) to generate squre waveforms of frequency 500 Hz using DAC 0800 with 8255 and8085 microprocessor, implement it.
4. Write an assembly language program for 8 – Bit binary up counter and implement it using 8255.
5. Write an assembly language program for 8 – Bit binary down counter and implement it using 8255.

(B)Project (Marks 20)

Every student should construct one *Suitable* project. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

Course: ELE-601A Paper – XXI(A)
(Effective from June 2011)
Title: PROGRAMMABLE LOGIC CONTROLLERS
Marks: 50 Periods: 45

1. Introduction to Programmable Controllers (15)

Industerial Motor Control circuits, Relay LadderLogic Circuits, building a
Ladder Diagram, Rack Assembly, Power Supply, PLC Programming Unit, Input / Output Sections, Processor Unit, Addressing, Relationship of Data
File Addresses to I / O Modules

2. Fundamental PLC Programming (15)

PLC Program Execution, Ladder Diagram programming Language, Ladder
Diagram Programming,Relay logic Instructions, Timer Instructions, Counter
Instructions, Data Manipulation Instructions, Arithmatic Operations, Writing
a Program

3. Advanced Programming, PLC Interfacing and Troubleshooting (15)

Jump Commands, Data Manipulations, Discrete Input / Output Modules, Troubleshooting I / O Interfaces,

Books Recommended

1. Industrial Electronics { Circuits, Instruments and Control Techniques} –
Terry Bartelt, DELMAR, Cengage Learning India Pvt. Ltd. Delhi, 2009
2. Introduction to Power Electronics – V Jagannathan, PHI, New Delhi, 2004
3. Power Electronics – M D Singh and K B Khanchandani,

Course: ELE-601 B Paper – XXI (B)
(Effective from June 2011)
Title: INSTRUMENTATION
Marks: 50 Periods: 45

1. Qualities of Measurements (10)

Performance Characteristics, Static Characteristics, Errors in Measurement, Types of Static Errors, Sources of Errors, Dynamic Characteristics, Standard, Atomic Frequency and Time Standards.

2. Displays and Recorders (15)

LED display SSD Display , LCD display, X-Y recorder, Magnetic Tape recorder, Frequency modulation recording, Digital data recording.

3. Transducers (20)

Electrical transducers, selecting a transducer, Resistive transducer, Resistive position transducer, Inductive transducer, Differential output transducer, linear variable differential transducer(LVDT), capacitive(pressure) transducer, Load Cell, Piezo – electric transducer.

Photo electric transducers: - photo multiplier tube, photo cells, photo-voltaic cell, semiconductor photo diode, photo transistor.

Temperature transducer:- RTD, Resistance thermometer, Thermistor, Thermocouple.

Books Recommended

1. Electronic Instrumentation –Second edition by H.S.Kasi (Mc Graw Hill Company)
2. Transducers and Instrumentation by D V S Murty (PHI)

Course: ELE-602 A Paper – XXII (A)
(Effective from June 2011)
Title: MICROCONTROLLER – II
Marks: 50 Periods: 45

1. 8051 Timer Programming in Assembly Language (9 periods)
Programming 8051 Timers, Counter Programming,

2. 8051 Serial Port Programming in Assembly Language (12 periods)
Basics of Serial Communication, 8051 Connection to RS232, 8051 Serial Port Programming in Assembly

3. Interrupts Programming in Assembly Language (12 periods)
8051 Interrupts, Programming Timer Interrupts, Programming External Hardware Interrupts, Interrupt Priority in the 8051 / 8052

4. LCD, Keyboard, ADC, DAC and Sensor Interfacing (12 periods)
LCD Interfacing, ADC {0808}, DAC{0808} Interfacing, Sensor Interfacing and Signal Conditioning {LM34 and LM 35}

Books Recommended:

1. The 8051 Microcontroller and Embeded system – M A Mazadi, J G Mazadi and R D McKinlay, Pearson PHI, 2009
2. The 8051 Microcontroller – K J Ayala, DELMAR, Cengage Learning India Pvt. Ltd. Delhi, 2008
3. Microcontrollers [Theory and Applications] – Ajay Deshmukh, TMH, New Delhi, 2009

Course: ELE-602B Paper – XXII (B)

(Effective from June 2011)

Title: 8085 INTERFACING – II

Marks: 50 Periods: 45

1. 8253 / 8254 Programmable Interval Timer (15)

Intoduction, Features of Programmable Interval Timer, Pin Configuration of 8253 / 8254, 8253 / 8254 Functional Block Diagram, Controle Word Register Format, Modes of Operation, 8253 Write Operation, 253 Read Operation

2. DMA Controlled I / O and DMA Controller (15)

Intoduction, Requirements of DMA Controlled Input / Output, The DMA Controller, Programmable DMA controller 8257, Organization, Operating Modes of 8257

3. Interrupt System and Controller (15)

The 8259 Interrupt Controller, Organization, 8259 – A Programming, command Words of 8259 – A, Singal PIC System, Cascaded PICs System (Vectored Mode), Polled System

Books Recommended:

1. 8 – Bit Microprocessor System Design – V J Vibhute and P B Borole, Technova Publications, Pune

2. Microprocessor Architechture, Programming and Applications with 8085 – Ramesh S Gaonkar, Penram International Publishing

Course: ELE-603 A Paper – XXIII (A)
(Effective from June 2011)
Practicals Based on Paper XXI (A)

Every candidate appearing for examination must produce journal showing
that he/she has completed *Four* (04) experiments during the semester. The
journal must be certified at the end of the semester by The Head of the Department.

VII – A: Experiments (Marks 30)

1. Study of Water Level Controller, Using PLC Simulator.
2. Study of Traffic Light Control, Using PLC Simulator.
3. Study of Horizontal Motion of Conveyor Belt using Limit Switches, Using PLC Simulator.
4. Study of Lift Control, Using PLC Simulator.
5. Study of Bottling Plant with Counter, Using PLC Simulator.

VII – B: Project (Marks 20)

Every student should construct one *Suitable* project. He/she should submit
the project and project report thereon at the time of practical examination.
The project report must be certified at the end of the semester by The Head
of the Department.

Course: ELE-603 B Paper – XXIII (B)

(Effective from June 2011)

Practicals Based on Paper XXI (B)

Every candidate appearing for examination must produce journal showing that he/she has completed *Four* (04) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

A: Experiments (Marks 30)

1. Study of IC AD590 as Temperature sensor.
6. Study of PT100 as Temperature sensor.
7. Study of Thermistor as Temperature sensor.
8. Study of photo transistor & photo diode as light sensor
9. Study of photo voltaic cell & LDR as light sensor
10. Study of temperature sensing transducer.
11. Study of strain gauge transducer.

B: Project (Marks 20)

Every student should construct one *Suitable* project. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

Course: ELE-604A Paper – XXIV (A)
(Effective from June 2011)
Practicals Based on Paper XXII (A)

Every candidate appearing for examination must produce journal showing that he/she has completed *Six* (06) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments (Marks 50)

1. Write a program to generate square waveforms and implement it using Atmel 89C51 with DAC.
2. Write a program to staircase waveforms and implement it using Atmel 89C51 with DAC.
3. Write a program to generate triangular waveform with period of 1ms and implement it using Atmel 89C51 with DAC.
4. Write a program for stepper motor direction control using a switch and implement it using Atmel 89C51.
5. Write a program to display Microcontroller on 2 × 8 LCD module and implement it using Atmel 89C51.
6. Interfacing of matrix keyboard using MCS – 51.
7. Program based on MCS – 51 TIMER.
8. Program based on MCS – 51 COUNTER.
9. Program based on MCS – 51 INTERRUPT.
10. Temperature Controller with MCS – 51.

Course: ELE-604B Paper – XXIV (B)

(Effective from June 2011)

Practicals Based on Paper XXII (B)

Every candidate appearing for examination must produce journal showing that he/she has completed *Six* (06) experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments (Marks 50)

1. Study of decoder.
2. Study of 8253 in mode '0'.
3. Study of 8253 in mode '1'.
4. Study of 8253 in mode '2'.
5. Study of 8255 in BSR Mode.
6. Interfacing of ADC with 8255.
7. Interfacing of stepper motor for
(a) Clockwise rotation
(b) Anti clockwise rotation
8. Interfacing of LCD using 8255.