

Shivaji University Kolhapur
B.C.S.PART I
ELECTRONICS PAPER I
(ELECTRONIC DEVICES AND CIRCUITS)

SETION I

UNIT 1: Liner components in computer(12)

Resistors: Clasifications,costruction of carbon composition resistor only,colour code, specifications of resistors

Capacitors:Clasification,construction of electrolyte capacitor only, finding value of capacitor using colour code, number

Inductors: types of inductors ,uses, types of transformers ,construction of step down transformer and its specifications

Types of switches, construction and working of electro mechanical relay

UNIT2 : DC circuit analysis (06)

Ohm's law , Kirchoff's current and voltage law , concept of current source, voltage source ; application of Kirchoff's laws to simple circuits,

Concept of equivalent circuits;,Thevenin's Theorem ; Norton's Theorem, superposition , maximum power transfer theorem, (only statement and examples) .

UNIT 3: Semiconductor Diode (06)

Formation of p-n junction ;depletion layer , working and parameters of rectifier diode, Zener diode ,its parameters, photodiode and LED,current limiting resistor for LED

Applications - optocoupler, dot matrix display of LED, 7 segment display.

UNIT 4: Bipolar Junction Transistor (08)

Structure and working of bipolar junction transistor; CB, CC, CE configurations; CE mode characteristics; relation between α and β ., DC load line and Q point. potential divider Biasing,Concept of transistor as an amplifier and transistor as a switch -

Applications – Audio amplifier, use of transistor to switch LED

SECTION II

UNIT 5: Field Effect Transistor (08)

Structure and working of: JFET I-V characteristics and parameters (transconductance, drain resistance, pinch of voltage, amplification factor); MOSFETS (construction and application only)

Applications: FET as -Voltage Variable resistance (VVR), inverter, switch, memory cell, DRAM

UNIT 6: Amplifier And Oscillators(06)

General classification of amplifier based on frequency response and Q point; idea of multistage amplifier: coupling skims (Direct coupling, RC coupling, Transformer coupling) concept of positive and negative feedback.

; Barkhausen criteria; ; Hartley oscillator; Colpitts oscillator., Crystal Oscillator (Only working of circuit and formula for frequency)

UNIT 7: Operational Amplifiers(08)

Concept of operational amplifier (black box level); ideal characteristics of Opamp; Opamp as comparator; Virtual ground concept

Applications: Unity gain amplifier, buffer, inverting amplifier, non-inverting amplifier, Comparator, Adder, subtractor, integrator and differentiator, Phase shift Oscillator using OP AMP

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UNIT 8: Power Supply (10)

working of rectifier (Half, Full, Bridge) ; concept of ripple voltage ; filter circuits; regulated power supply ; concept of load and line regulation ; Zener as regulator ; 3- pin positive and negative voltage regulator ;

SMPS block diagram ; UPS : online and offline (block diagram and different parameters) ;

RECOMMENDED BOOKS:

1. Principles of Electronics: A.P.MALVINO, Tata Mc-Graw Hill Publication, 7th Edition.
2. A text Book of Applied Electronics R.S.Sheda, S chand Publication
3. Electronic Devices and circuits by S Rama Reddy, Narosa Publication Dheli
4. Principles of Electronics: V.K. Meheta, S.Chand & company Ltd. 5th Edition
5. Basic Electronics and Linear Circuits : N N Bhargava , D C Kulshreshtha , S C Gupta , Tata McGraw Hill Publishing company
6. Electronic Devices and circuits: Boylestad, Tata Mc-Graw Hill
7. Operational Amplifiers By Ramakant Gaikwad

PAPER II
DIGITAL ELECTRONICS
SECTION I

UNIT 1: Number System AND Binary Codes (06)

Binary, Octal, Hexadecimal Number system ; Interconversion from one system to another , BCD code, Gray code, Excess-3 code, ASCII code, Concept of parity. Signed and unsigned numbers , 1's complement and 2's complement of binary numbers and binary arithmetic.

UNIT 2: Logic Gates (06)

Logic gates –AND,OR,NOT,NOR,NAND,EX-OR(Symbol,Expression and Truth Table) Boolean algebra and identities; De Morgan's theorem and Interconversion of logic gates; Simplifications of logic expressions using a) Boolean algebra, b) K-map. Introduction to logic families; TTL NAND gate , input output parameters, tristate logic, fan in, fan out, propagation delay, noise margin.

UNIT 3: Combinational Circuits (10)

Half adder, Full adder, half subtractor, Parallel adder, nibble Adder; Arithmetic logic unit, Encoder, Decoder, Multiplexer, and De multiplexer, concept of analog multiplexer. Pin Configuration of 74153,74156,7447,74138

UNIT 4: Sequential circuits (10)

Concept of sequential circuits ;Latch , Flip-flops : RS, clocked RS, JK, Master Slave JK, Counter - synchronous, asynchronous, up-down counter, modulo –N counter, decade counter (IC 7490); shift register (IC 7495), ring counter, Johnson counter;

SECTION II

UNIT 5: Multivibrator (06)

Types of multivibrator, Block diagram of IC 555; Application of IC 555 as Astable, and Monostable (Calculation of frequency and Pulse width) Crystal clock using inverter. Clock circuit using NAND gate

UNIT 6: Memory devices and memory Organization (10)

Types of Memory - volatile and nonvolatile, SRAM and DRAM, Classification and working principle of memory devices ; RAM, ROM, PROM, EPROM, EEPROM ; Concept of Diode Matrix ROM, speed and cost range of memory devices, Memory organization –building the required memory size by using available memory chips, memory address map

UNIT 7: Introduction to Microprocessors(08)

Introduction, Types, (8, 16, 32 Bits), Pin Diagram And Architecture of 8085, Pin Diagram And Architecture of 8086

UNIT 8: Programming of Processor(08)

Instruction Set of 8085, ALP Programs for Data transfer Additions, Subtraction, Multiplication, Division, Block Transfer

RECOMMENDED BOOKS:

1. Digital principals and applications: Malvino Leach, Tata McGraw Hill, 4th Edition
2. Fundamentals of Digital Electronics: A. Anand Kumar PHI Publications 2001
3. Digital Principles: T.L. Floyd 3rd edition
4. Digital Electronics: C.F. Strangio
5. Modern digital Electronics: R.P. Jain, Tata Mc-Graw Hill Publication
6. Digital logic and computer design-Morris Mano
7. First course in Digital System Design: John P. Uyemura, Brooke/Cole, Thompson Learning (2001)
8. 8085 Microprocessor By R.S. Gaonkar
9. 8085 Microprocessor By B. Ram

PRACTICALS

Group A

- 1) Positive & Negative voltage regulators using 3 pin IC'S
- 2) Verification of Krichhoff's Laws
- 3) Study of CRO
- 4) Transistor as switch(Application for LED & Relay)
- 5) Phase shift oscillator using 741
- 6) Adder & subtractor using 741
- 7) Temperature controller using LM35 and 741
- 8) Study of full wave rectifier with & without filter (calculation of ripple)
- 9) Transistor Characteristics in CE (calculation of β)
- 10) Characteristics of JFET calculation of parameters
- 11) Study of crystal oscillator using transistor and gate

Group B

- 1) Study of basic gates
- 2) Universal building block
- 3) Verification of De-Morgans Theorms
- 4) IC 555 as astable, Monostable Multivibrator
- 5) Study of Flip-Flops(D & JK)
- 6) Study of counter
- 7) Study of shift Register
- 8) Half & full adder
- 9) Multiplexer & Demultiplexer using IC'S
- 10) Arithmetic operations using 8085 μ p kit or simulator
- 11) Block transfer using 8085 kit or simulator

**NATURE OF QUESTION PAPER
For Paper I & II**

SECTION I

Q1. Objective(Multiple Choice)	10 Marks
Q.2. Long Answer questions(Any TWO out of Three)	20 Marks
Q.3. Short Answer questions(Any FOUR out of Five)	20 Marks

SECTION II

Q4. Objective(Multiple Choice)	10 Marks
Q.5. Long Answer questions(Any TWO out of Three)	20 Marks
Q.6. Short Answer questions(Any FOUR out of Five)	20 Marks

Equivalence

Paper	Old course Name	New Course
I	Liner Electronics	Electronic Devices and Circuits
II	Digital Electronics	Digital Electronics

