

Autonomous Mata Gujri Mahila Mahavidhyalaya Marhatal (JBP)
Accredited By NAAC Grade "A"
Recognized By Govt. of M.P. and Affiliated to R.D.V.V. Jabalpur (M.P.)

B.Sc. I Year 2017-2018

Subject : Electronics

Paper: I

Electronics Circuits And Fundamentals Of Digital Electronics

Max. Marks :40

UNIT I – Passive Components

18 Lectures

Resistors :- Symbols, colour coding, resonance tolerance, power rating, types of resistors.

Capacitor :- Symbols, colour coding, tolerance voltage rating, types of capacitor.

Inductors :- Symbols, types of inductors, idea of value available in the market, idea of chock, practical significance of above component.

Transformer :- Working principle of transformer, transmutation ratio, transformer efficiency, types of cores, types of transformer.

PCB:- Introduction to insulating materials & their types. Types of PCB layout technicables & connectors.

UNIT II

18 Lectures

Resonance circuits & network theorem, phasor representation of voltage & current, basic idea of LCR circuits, series & parallel resonance circuits. Quantity factor, integration & differentiation using R-C circuit.

Network theorem :- Network definition, loop & node analysis super position theorem, Thevenin theorem, Norton's theorem, maximum power transfer theorem, Reciprocity theorem.

UNIT III Semiconductor Physics

18 Lectures

Basic idea of crystal structure, energy band differentiate conductors, semiconductors & insulator. Carrier concentration at normal equilibrium in an intrinsic semiconductors extrinsic semiconductor. Law of mass action donors & acceptors, physical picture of electrons & holes as majority carries Fermilevel for intrinsic semiconductors, idea of drift & diffusion current.

UNIT IV P-N Junction

18 Lectures

Formation of depletion region, potential barrier, P-N junction diode, forward & reverse bias, resistance of P-N junction diode & its variation with biasing static & dynamic resistance of diode, current voltage characteristic, derivation of potential barrier, definition of transition capacitance, capacitance voltage. Relationship for an abrupt P-N junction diode, avalanche breakdown & Zener effect, basic idea of varactor diode, tunnel diode, LED (Light Emmiting Diode), solar diode with their working.

UNIT V Transistors

18 Lectures

P-N-P & N-P-N Transistors, transistor action, definition of α , β , γ and their inter relationship characteristic curve of BJT, interpretation of action saturation & cut of region determination of AC & DC load line, operation point for CB,CE, CC, transistor, hybrid model of CB,CE & CC transistors, CB,CE, CC equivalent circuit. Basic idea of junction capacitance, transistor biasing, stability factor, stabilization against change in β , I_w & V_{be} for fixed bias circuit collector to base bias & self bias.

Books for Study:

1. Sahdev S.K... *A Text Book of Electronics Principles*, Dhanpat Rai & Sons.
2. Gupta & Kumar, *Handbook of Electronics*, Pragati Prakashan.
3. Gaur R.K. *Digital Electronics & Microprocessor*, Dhanpat Rai & Sons.
4. Mehta V.K. *Principles of electronics*, S. Chand & Co.
5. Boylestad, *Electronics Devices & Circuits*, Prentice Hall of India Pvt. Ltd.
6. Motershed Allen , *Electronics Principles*, Prentice Hall of India Pvt. Ltd.

Reference Books:

1. Mithal G. K., *Electronics Devices & Circuits*, G.K. Publishers Pvt. Ltd.
2. Navneeth, *Digital Analogue Techniques*, Kitab Mahal.

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B.Sc. I Year
Paper: II
Subject : Electronics
Electronics Circuits And Fundamentals Of Digital Electronics
Max. Marks :40

UNIT I

18 Lectures

Rectifiers And Power Supply- Half wave, Full wave and Bridge rectifiers, Ripple factor and Power conversion efficiency for the half wave and full wave rectifiers.

Filter-Need for filter in Power Supply, Series inductor, Shunt Capacitor, L section, Pi section, T section filters.

Power Supply - Block diagram of simple power supply, Regulated Power Supply, Line & Load Regulation. Characteristics of Power Supply, Zener diode as a voltage regulation. Three terminal IC Power Supply (IC 78XX & 79XX).

UNIT II

18 Lectures

Field Effect Transistors- The construction and working of JFET. The ideal of channel width. Field dependent mobility showing current dependence of voltage. Physical explanation of different regions of I.V. curves. Various parameters of JFET.

MOS Devices, Basic Structure and energy level diagram. The basic construction of MOSFET and its working. Physical explanation of the curves enhancement and depletion modes MOSFET parameters.

UNIT III

18 Lectures

Amplifiers – Different Terms used in Amplifiers, such as a Signal **Source**, Input , Output, Voltage And Current Gain. Power Gain, Decibel, Input and Output Impedance, Classification According to the frequency Response, Class A, Class B, and Class C amplifier, Power amplifier, Analysis and design considerations of Push pull amplifiers. **RC Coupled Amplifier-** Gain for high, mid and low frequency range, calculation of half power points, Band width and figure of merit. Feedback in amplifier, Advantage of negative feedback amplifier, Voltage and current feedback circuits.

UNIT IV

18 Lectures

Application Of Diode And Transistors-Idea of positive, negative biased combination, Clipping circuits, Clamping circuits.

Multivibrators :- Astable, Monostable and Bistable Circuits, Working and Applications.

Oscillators:- Barkhausen circuit for self sustained oscillations. Working of Hartley Colpitt Phase shift and Wein bridge oscillators.

UNIT V

18 Lecture

Basics Of Digital Electronics – Binary numbers, binary to decimal conversion, decimal to binary conversion. Binary additions, Binary subtraction 1's Complements 2's Complements, Binary multiplication and division, octal and hexadecimal number, Inter conversion of various number systems, BCD code and Grey code, Boolean laws, De'Morgan's Theorem- statement and proof, Karnaugh Map Simplification.

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Practicals

Note:- A student is required to do at least 10 experiments in one semester should be done. The scheme of examination will be as follows:

Scheme of Examination:-

1. One experiment of three hours duration.
2. Marks :Experiment: 30
Sessionals : 10
Viva : 10
Total Marks : 50

List of Practical

1. Testing & Identification of different Components(Resistors Capacitor Inductors,Cables)
2. Measurement of frequency and voltage of sine,square and triangular waves using CRO and function generator.
3. Study of charging & Discharging of an Electrolyte Capacitor and calculate the Time Constant.
4. Study of P-N Junction diode characteristic curve.
5. Study of zener diode characteristic curve.
6. Study of LCR series resonance circuit.
7. Study of parallel resonance circuit.
8. Verification of maximum power transfer theorem.
9. Verification of Thavnin theorem.
10. Designing of PCB for a given electronic circuit.
11. Study of Half and full wave rectifiers.
12. Study of Regulated Power Supply using Zener Diode.
13. Study of Output Characteristics Curve of Bipolar Junction Transistor in Common Base and Common Emitter Configuration.
14. Study of RC Coupled Amplifier.
15. Study of Phase Shift Oscillator.
16. Study of Hartley Oscillator.
17. Study of Simple Clipping Circuits using PN Junction Diode.
18. Fabrication of PCB using Software developed layout.
19. Study of Regulated Power Supply using IC 78XX & 79XX series.
(Or any other experiment of similar standard)