

ELECTRONICS
Class 12th

Maximum Marks: 100

Time: 3 hours

Theory: 70 marks

Practical: 30 marks (Internal Assessment: 10 marks, External: 20 marks)

Unit-I

Design of combinational Logic Circuits:

(Marks = 15)

Conversion of Boolean expression to canonical forms: Sum Of Products (SOP) and Product Of Sums(POS) forms. Use of Karnaugh map (upto three variables) for minimization of Boolean expressions. Converting expressions to logic circuits. Half-adder, full- adder. Subtractors: half subtractor, full subtractor.

Unit-II

Semiconductors:

(Marks =10)

Electronic structure of atoms, energy band theory of Solids: insulators, semiconductors and conductors., intrinsic semiconductors, effect of temperature and doping, extrinsic semiconductors — donor and acceptor impurities in semiconductors, n-type and p-type semiconductors, Transport phenomenon in semiconductors (Drift and Diffusion)

Unit-III

Semiconductor Diode:

(Marks = 15)

P-N Junction: depletion region, Junction Barrier, effect of voltage on movement of charges carriers across junction. V-I characteristics, Diode resistance. Diode as rectifier (half wave and full wave), average value, ripple factor and efficiency.

Unit-IV

Bipolar Junction Transistor (BJT)

(Marks = 15)

Transistor: PNP and NPN, Working Principle, Transistor configurations: CE and CB. α and β of a transistor and their relationship, characteristics of CE. Concept of Load line and Q-point. Transistor as an amplifier in CE arrangement, Active , cutoff, saturation regions.

Unit-V

Communication:

(Marks = 15)

Modulation, need for modulation, carrier wave, types of modulation, Amplitude modulation, graphical representation of AM wave, percent modulation, calculation of modulation index from waveform, , upper and lower side frequencies (qualitative treatment only). Limitations of AM. Frequency modulation, Graphical representation of FM wave, Qualitative concepts about the bandwidth and side frequencies. Advantages of FM over AM. Qualitative concept of Demodulation.

PRACTICALS (HSP-II)

- 1) Identification of Various electronics components from mixed collection of items.
- 2) To implement a circuit given in the expression using logic gates.
- 3) To design and implement a half adder using logic gates.
- 4) To design and implement a full adder using logic gates.
- 5) To design and implement a half subtractor using logic gates.



- 6) To design and implement a full subtractor using logic gates.
- 7) To study the V-I Characteristics of Semiconductor diode in forward bias.
- 8) To study the V-I Characteristics of Semiconductor diode in reverse bias.
- 9) To study a half wave rectifier.
- 10) To study a Full Wave rectifier.
- 11) To study the characteristics of NPN transistor.
- 12) To study the characteristics of PNP transistor.
- 13) To study common emitter npn transistor as Switch.
- 14) To study Common Emitter npn transistor as an Amplifier
- 15) Use of Multimeter to
 - (a) identify base of Transistor.
 - (b) distinguish between NPN and PNP type transistors.
 - (c) see the unidirectional flow of current in case of a diode.
 - (d) check whether a given electronic component is in working order.
- 16) To study the amplitude modulation, trace the waveform and calculate the modulation index.
- 17) Design and implement Simple electronic circuits.

