

1. Define semiconductor
2. Classification of semiconductors
3. Conductor, semiconductor, insulator in the terms of energy band diagram. (Explain the classification of materials according to energy band.)
4. Explain the N-type-semiconductor with an energy band diagram.
5. Explain the formation of a p-type semiconductor
6. What is a PN junction? Describe the condition of a P-N junction when it is under (i) No bias (zero); (ii) Forward bias; (iii) Reverse bias position.
7. Describe what happens when a P-type and N-type material are brought together hence define barrier voltage.
8. What is Doping? Why is doping needed? Types of doping.
9. Explain the effect of temperature on semiconductors.

1. Explain Light Emitting Diodes (LED), photodiode, tunnel diode, bandwidth, Rectifier, Clipper, cut in voltage
2. What are the advantages of a full wave rectifier over a half wave rectifier?
3. Draw the circuit diagram of a half wave and a full wave rectifier and describe their operation.
4. Explain the operation of the Zener diode as a voltage regulator.
5. Describe the construction and operation of LEDs.
6. LED Vs Zener diode.

1. What is a transistor? Discuss the working principle of NPN transistors.
2. Explain the Working of n-p-n Transistor
3. Explain the Working of PNP Transistor
4. What is BJT? Describe the working principle of a BJT
5. Draw and Explain input and output characteristics of a common emitter configuration of BJT
6. Deduce the relation between α and β of BJT
7. Draw a voltage divider bias circuit and explain its operation

1. Define Field Effect Transistor (FET)
2. Explain N-Channel JFET
3. Define MOSFET
4. Explain Enhancement Mode of MOSFET.
5. What is FET? Draw and explain JFET characteristics curve with external bias.
6. Compare BJT, FET and MOSFET
7. Differentiate Enhance MOSFET and Depletion MOSFET (D MOSFET)
8. How FET can be used as a switch
9. Draw and explain input and output characteristics of a common base configuration of BJT.

1. What is feedback? Write the advantages and disadvantages of negative feedback
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2. Define positive and negative feedback. List the five characteristics of an amplifier which are modified by negative feedback
3. Define negative feedback. Explain how negative feedback reduces noise and non-linear distortion
4. Explain the operation of the transistor as an amplifier.
5. Draw different types of feedback circuits and Explain how negative feedback decreases gain

1. What is an oscillator? Discuss the advantages of an oscillator.
2. Draw the circuit diagram of a phase shift oscillator and explain its operation
3. Draw the circuit diagram of a phase-shift oscillator and find out the expression for the frequency oscillation.
4. State and explain superposition theorem.

1. What is an operational amplifier? What are salient features of an OP-Amp (operational amplifier)?
2. Define CMRR and slew rate and virtual ground
3. Explain how op-a can be used as a: (i) Differentiator (ii) integrator (iii) inverting amplifier (iv) Non-inverting (v) Voltage follower (vi) summing amplifier
4. Write down the characteristics of an ideal operational amplifier.
5. Draw the non-inverting amplifier using an operational amplifier and find out the expression for the voltage gain.