EC6202- ELECTRONIC DEVICES AND CIRCUITS

UNIT I

PN JUNCTION DEVICES

PART-A

1. Define Semiconductor.
2. Classify Semiconductors.
3. Define Hole Current.
4. Define Knee voltage of a Diode.
5. What is Peak Inverse Voltage?
6. Define Depletion Region in PN Junction Diode.
7. What is Barrier Potential?
8. Define Reverse Saturation Current in PN Junction Diode.
9. What is meant by Diffusion Current in a Semi-conductor?
10. A silicon diode has a saturation current of 7.5 μA at room temperature to 300 °K. Calculate the saturation current at 400 ° K.
11. What is meant by dynamic resistance of diode?
12. Differentiate between Zener Breakdown and Avalanche breakdown.
13. Define Rectifiers. List the types of Rectifiers.
14. Compare the various types of Rectifiers.
15. Define Voltage Regulators. List the types of Voltage Regulators.
16. What is the necessity of Filters? List the types of Filters.
17. Define Electroluminescence.
18. What are the advantages of LCD Displays?
19. What is transition capacitance
20. Comparison of diffusion and transition capacitance

PART-B

1. With a neat diagram explain the working of a PN junction diode in forward bias and reverse bias and show the effect of temperature on its V-I characteristics. (16)
2. Explain V-I characteristics of Zener diode. (8)
3. Draw the circuit diagram and explain the working of full wave bridge rectifier and derive the expression for average output current and rectification efficiency. (8)

4. Explain the operation of FWR with centre tap transformer. Also derive the following for this transformer.dc output voltage (4) dc output current (2) (iv) RMS output voltage. (4)
5. Explain the following regulator circuits : (i) Transistorized shunt regulator. (8) (ii) Zener diode shunt regulator. (8)
6. Draw the circuit diagram and explain the operation of full wave rectifier using center tap transformer and using bridge rectifier without center tap transformer. Obtain the expression for peak inverse voltage. (16)
7. With neat diagram explain the construction and working of LED. (8)
8. Explain the working of LCD seven segment display using square wave supply. (8)
9. Explain Insulator, Semiconductor & conductor with help of energy band structure.
10. Write down the expression for transient capacitance and diffution capacitance(8)
11. Why the Zener diode is called as regulator(8)
12. Compare zener diode with ordinary diode(8)

UNIT II

TRANSISTORS

PART-A

1. Define cutoff voltage of a transistor.
2. What does UJT stands for? Justify the name UJT.
3. Give the symbol and structure of TRIAC.
4. Give the application of TRIAC.
5. Give some applications of DIAC.
6. Give the basic construction and symbol of DIAC.
7. What is a SCR?
8. Define break over voltage of SCR.
9. Why SCR cannot be used as a bidirectional switch.
10. How turning on of SCR is done?
11. Define holding current in a SCR.
12. List the advantages of SCR.
13. List the application of SCR.
14. What is meant by latching?
15. List the important ratings of SCR.
16. Compare SCR with TRIAC.
17. Differentiate BJT and UJT.
18. What is a thyristor?
19. Give the various triggering devices for thyristors.
20. Power MOSFET is a voltage controlled device. Why?

PART – B

1. Compare the following.DMOSFET& EMOSFET (8)
2. N-channel MOSFET & P-channel MOSFET. (8)
3. Explain the biasing technique for JFET. (16)
4. Explain the construction and characteristics of JFET. (16)
5. Explain the construction and characteristics of EMOSFET. (16)
6. Explain the construction and characteristics of DMOSFET. (16)
7. Explain the biasing characteristics of MOSFET. (16)
8. Explain the working and principle of operation of UJT and mention its applications.(16)
9. Explain the working and characteristics of SCR and its applications. (16)
10. Briefly explain the operation of DIAC (8)
11. Briefly explain the operation of TRIAC (8)
12. Explain the principle and operation of bidirectional switch(16)

UNIT III
AMPLIFIERS

PART-A

1. What is an amplifier?
2. How are amplifiers classified according to the input?
3. How are amplifiers classified according to the transistor configuration?
4. What is the different analysis available to analyze a transistor?.
5. How can a DC equivalent circuit of an amplifier be obtained?
6. List out the parameters of hybrid model.
7. Why CE configuration is preferred over CB configuration
8. Draw the π model circuit for CE
9. Draw the π model circuit for CC
10. Draw the h model circuit for CE
11. Draw the h model circuit for CB
12. draw a source follower circuit.
13. Draw the circuit diagram of CS amplifier.
14. Define base width modulation(early effect).
15. Define current gain and voltage gain.
16. Define input impedance and output impedance of a transistor.
17. Define amplification factors.
18. Define base spreading resistance.
19. Deduce the relation between amplification factors.
20. Define thermal run away and heat sink.

PART-B

1. Describe the methods of determination of h-parameters from its static Input and output characteristics. (8)
2. Draw and explain the h-parameter equivalent circuit of a transistor in CC configuration. derive the expressions for input impedance ,output impedance, voltage gain and current gain (16)
3. Explain the switching characteristics of a transistor with neat sketch. (10)
4. Describe the static input and output characteristics of CB configuration of a transistor with neat circuit diagram. (16)
5. Derive the expression for current gain, input impedance and voltage gain of a CE Transistor Amplifier. (16)
6. Draw the circuit for determining the transistor common base characteristics and explain how the characteristics are measured and draw the graphs. (16)
7. For a common emitter circuit draw the h-parameter equivalent circuit and write the expressions for input impedance, output impedance and voltage gain. (16)
8. Explain the midband analysis of single stage CE, CB and CC amplifiers. (16)
9. Explain the analysis of low frequency response of RC coupled amplifiers. (16)
10. Compare the characteristics of the different configurations of BJT amplifiers.(8)
11. Draw and explain the hybrid π model of a CE configuration of a transistor and derive the necessary expressions.(16)
12. Draw and explain the h-parameter equivalent circuit of a transistor in CE configuration. derive the expressions for input impedance ,output impedance, voltage gain and current gain (16)

UNIT IV
MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER

PART-A

1. What is an amplifier?
2. How are amplifiers classified according to the input?
3. How are amplifiers classified according to the transistor configuration?
4. What is the different analysis available to analyze a transistor?
5. Briefly define about class B amplifier
6. What is cross over distortion?
7. Define Common Mode Rejection Ratio.
8. How can a DC equivalent circuit of an amplifier be obtained?
9. Mention the advantages of Push pull amplifier
10. What is need of Complementary symmetry amplifiers?
11. Difference between common mode and difference mode?

12. Mention the neutralisation techniques
13. Advantages of class-c amplifier
14. What is source follower
15. MOSFET small signal model parameters
16. What is the need of heat sink
17. Compare gain and frequency
18. What is BIMOS cascade amplifier
19. What is single tune amplifier
20. List out the efficiencies of power amplifiers

PART – B

1. How to eliminate the cross over distortion.
2. Explain the heat sink design.
3. Explain neutralization techniques
4. Explain working about differential amplifier and derive expression for CMRR
5. Explain transfer characteristics of differential amplifier and derive expression for the same.
6. Explain about single tuned amplifiers
7. Compare the characteristics power amplifiers.
8. Make complete analysis of single tuned amplifier &derive the necessary expressions.
9. Neutrodyne neutralization techniques
10. Hazeltine neutralization techniques
11. Draw a neat circuit diagram and explain working of cascade amplifier and derive the expression for gain and frequency.
12. Describe the input stages of FET amplifiers.

UNIT V

FEEDBACK AMPLIFIERS AND OSCILLATORS

PART-A

1. What is feedback?
2. What are feedback amplifiers?
3. What are the types of feedback?
4. What is positive feedback?
5. What is negative feedback?
6. Which feedback decreases the gain of the amplifier?
7. Which feedback increases the gain of the amplifier?
8. What is the advantage of negative feedback?
9. What is the disadvantage of negative feedback?
10. Define sensitivity.

11. Define Desensitivity.
12. What is oscillator circuit?
13. What are the conditions for sustained oscillator or
14. what is Barkhausen criterion?
15. What are the classifications of Oscillators?
16. What is Miller crystal oscillator? Explain its operation.
17. State the frequency for RC phase shift oscillator.
18. Draw the equivalent circuit of crystal oscillator.
19. List out the essential blocks of an oscillator.
20. What is oscillator phase shift?

PART – B

1. Explain voltage series and shunt feedback amplifier with an example. (16)
2. Describe the characteristics. Negative feedback. (8)
3. Describe the characteristics Positive feedback. (8)
4. Explain the current series and shunt feedback amplifier with an example. (16)
5. Explain the principle of operation and derive the expression for wein bridge oscillator.(16)
6. Explain the principle of operation and derive the expression for colpitts oscillator.(16)
7. Derive the expression and characteristics of oscillator
    i. RC Phase shift. (8)
    ii. Hartley. (8)
8. Explain the operation and advantages of crystal oscillators. (16)
9. comparison of positive and negative feedback(8)
10. Explain the voltage series and current shunt feedback amplifier with an example. (16)
11. Explain the current series and voltageshunt feedback amplifier with an example. (16)
12. Explain about high frequency oscillator working principle.(16)