ASSIGNMENT QUESTIONS

MODULE1: SEMICONDUCTORS DIODES AND ITS APPLICATIONS

1. Explain the quantitative theory of p-n junction.
2. With the help of the diode equation, explain the V-I characteristics of p-n junction
3. Explain the V-I characteristics with respect to the current equation
4. Draw and explain V-I characteristics of p-n junction diode
5. Write the current equation of a p-n junction and explain the V-I characteristics. What is the effect of temperature on cut-in voltage and reverse saturation current?
6. Differentiate between Zener breakdown and Avalanche breakdown
7. Draw and explain V-I characteristics of a p-n junction diode
8. Draw the volt- ampere characteristics of a silicon diode marking the cut-in voltage. Briefly explain the V-I characteristics with respect to the diode current equation
9. Draw and explain the V-I characteristics of silicon and germanium diodes
10. Write the diode equation and explain the significance of the terms
11. Define ripple factor show from first principles R.F.of a H.W.R.is1.21
12. Draw and explain the working of bridge type F.W.R with necessary waveforms. Derive the expression for Idc and η
13. Design the Zener regulator for the following specifications

Output voltage = 5V
Load current = 20Ma
Zener wattage = 500mW
Input voltage = 125± 3V

14. Draw the bridge rectifier circuit and explain its operation with wave form
15. Explain the working of a full wave bridge rectifier with the help of circuit diagram and

wave forms: Also derive the expression for Vdc.

16. Explain the working of NPN transistor.

17. Draw a sketch to show the various current components in a transistor. Briefly explain the origin of each current.

18. Draw and explain the input and output characteristics of a transistor in CE configuration.
19. Transistor means "Transfer Resistance". Discuss.

20. Write the circuit of Common Base configuration and explain its output characteristics.

21. Define α_{dc} and β_{dc} of a transistor. Obtain relationship between them.

22. Explain the concept of dc load line and ac load line of a CE amplifier.

23. Compare CC, CB, and CE configurations of a transistor in terms of current gain, voltage gain, input impedance and output impedance. Explain the performance parameters of transistor configuration.

24. Using graphical analysis, show how transistor could be used as an amplifier.

MODULE-2 TRANSISTOR BIASING

1. Discuss the thermal stability of a transistor bias circuit with regard to I_{CBO} and V_{BE}.

2. State approximations for variation in V_{BE} and I_{CBO} with temperature changes. Explain the temperature dependency of transistor characteristics.

3. Explain the operation of base bias circuit and write equations for I_B, I_C and V_{CE}.

Explain the procedure for precise analysis of voltage divider bias circuit.

4. Derive expression for current stability factor in self-bias circuit/fixed bias circuit.

5. Compare base bias, collector to base bias and voltage divider bias circuits.

6 Show how a voltage divider bias circuit may be compensated for V_{BE} changes with temperature. Derive an equation for I_C.

7. Explain the operation of the collector to base bias circuit and write equations for I_B, I_C and V_{CE}.

8. Compare base bias, collector to base bias and voltage divider bias with regard to stability of the transistor collector voltage with spread in h_{FE} value. Discuss the advantages and disadvantages of three types of bias circuits

9. For voltage divider bias circuit, write equations for calculating R_B, R_C and the voltage divider resistors.

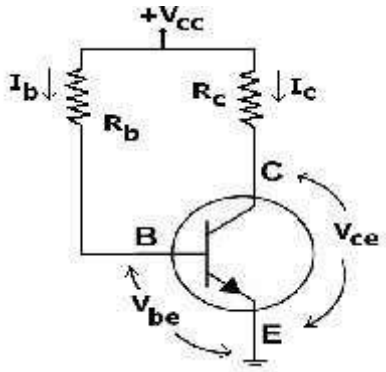
10.Write the equations for calculating R_B and R_C for a base bias and collector to base bias circuits.

11. Derive stability factor for collector to base bias circuit.

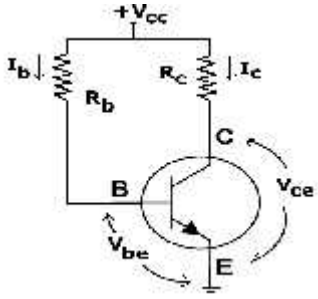
12.Derive stability factor for voltage divider bias circuit.

13.A transistor has I_B= 100μA and $I_{C=}$ 2mA. Find a) β and α of the transistor c) Emitter current I_E d) If I_B changes by +25μA and I_C changes by 0.6mA, find new value of β.

14. A transistor has β= 150, calculate collector and base currents if emitter current is 12mA. In the circuit shown, a silicon transistor with V_{be}= 0.7V, β= 50 is used. Draw dcload line and mark Q point for the given values of V_{CC} = 12 V,R_C = 2.2 KΩ, R_b =240 KΩ



15. Calculate the maximum and minimum values of I_C and V_{CE} for base biascircuit shown in the figure when $h_{FE\ (min)}$ =50 and $h_{FE\ (max)=200,for}$ agiven values of V_{be} = 0.7 V,V_{CC} = 18 V, R_C= 2.2 KΩ, R_b = 470 KΩ



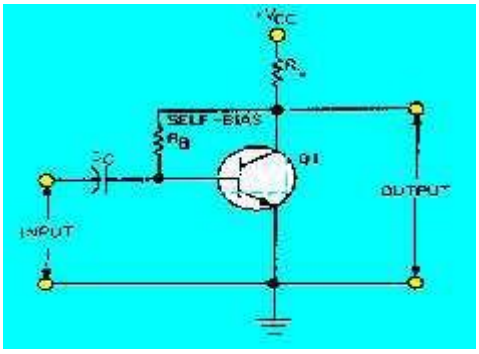
16. The voltage divider bias circuit has V_{CC}= 15V, R_1=6.8KΩ, R_2=3.3KΩ,R_3=900Ω, R_4=900Ω and h_{FE}=50. Give the approximate analysis to determine the levels of I_C and V_{CE}.

17.Design a collector to base bias circuit to have I_C=3.5mA and V_{CE}=12V. The supply voltage is V_{CC}=20V and the transistor h_{FE}=80 The base bias circuit has R_B=470KΩ, R_C=2.2KΩ, V_{CC}=18V and thetransistor has h_{FE}=100.Determine I_B, I_C and V_{CE}. Also calculate stability factor.

18.Analyze the voltage divider bias circuit to determine V_{CE}, I_C and V_C. Alsocalculate stability factor. Given R_1=33KΩ, R_2=12KΩ, R_E=1KΩ, R_C=1.2KΩ, V_{CC}=18V.

19. Design the voltage divider bias circuit to have V_{CE}=V_E=5V and I_C=5mA when supply voltage is 15V. Assume transistor is h_{FE}=100

20.Calculate the stability factor for collector to base bias circuit shown in figure. For the given values of V_{CC} = 18 V, R_L = 2.2 KΩ,R_B = 270 KΩ



OPERATIONAL AMPLIFIERS

1. What is an Op-Amp? What are the basic properties of an Op-Amp
2. Explain the working of Op-mp as

a) Summing Amplifier b) Integrator c) Differentiator

3. Explain the working of Voltage follower.

4. Explain the complete block diagram of OP-AMP.

MODULE -3: DIGITAL ELECTRONICS

1. Define following gates a. AND

b. OR

c. NOT

d. XOR

e. XNOR

2. State and explain De Morgan" s law, give suitable examples.

3. Why is NAND Gate called Universal Gate.

4. Realize r-Bit Binary Adder

5. Write the truth table for Full Adder also Write circuit diagram using basic gates.

MODULE-4: FLIP FLOPS AND MICROCONTROLLER\

1.What is the the difference between Latch and Flipflop?

2.Explain the working of clocked RS flipflop.

3.Explain the working of gated SR latch with examples

4.With neat block diagram explain the architecture of Microcontroller 8051.

5.Explain the internal structure of RAM.

MODULE-5: COMMUNICATION SYSTEMS

1.What is communication? Explain with block diagram.

2.What is Amplitude modulation? Write the waveform.

3.What is need for modulation?

4.Explain over and under modulation.

5.Derive the efficiency for amplitude modulation.

6.What are the limitations of AM?

7.Explain how AM is demodulated using square law detector?

8.What is frequency modulation? Explain narrow band and wide band FM.

9.Explain Carlson's rule.

10. Differentiate AM and FM.
11. What are transducers? Explain with block diagram.
12. Explain the classification of transducers
13. Explain Resistive transducers
14. Explain LDVT.
15. How temperature is measured using resistance?