Question Bank- Basic Electronics-19EC112

Questions on BJT

4 Marks

1. What is punch through effect in a transistor?
2. Calculate α_{dc} and β_{dc} for $I_C = 1mA$ & $I_B = 25\mu A$. Determine the new base current to provide a collector current of $I_C = 5mA$.

6 Marks

1. Explain the transistor as :
   i) an Amplifier
   ii) a Switch with neat circuit diagrams.
2. Draw the circuit diagram of a single stage RC coupled amplifier and explain the significance of each component.
3. Deduce the relationship between α and β of a transistor
4. With simple circuit diagram briefly explain the voltage amplification process in a transistor.
5. Draw the circuit for Common Emitter configuration using transistor in NPN mode. Sketch the input and output characteristics with the working and indicate various regions of operations.
6. Draw the circuit for Common Base configuration using transistor in NPN mode. Sketch the input and output characteristics with the working and indicate various regions of operations.

8 Marks

1. Describe the phase reversal concept in a single stage CE-RC coupled amplifier with a neat sketch. Explain the significance of coupling capacitors and bypass capacitor in the circuit. Draw the input/output waveforms.

Question Bank- Basic Electronics-19EC112

Questions on Feedback amplifiers and Oscillators

2 Marks

1. State Barkhausen's criteria for generating sustained oscillations.

4 Marks

1. State and explain Barkhausen's criterion for generating sustained oscillations with relevant diagrams.

2. Design the value of inductor to be used in Colpitt's oscillator tank circuit to generate a frequency of 10 MHz. The tank circuit has C_1=100 pF and C_2= 50 pF.
3. An oscillator circuit has an oscillating frequency of 2 kHz. Its feedback circuit has the value of capacitor as $C = 0.3\mu F$. What must be the value of R in the feedback circuit so that it generates sustained oscillations? Draw the oscillator circuit.
4. An oscillator circuit has 2 capacitors of values $0.01\mu F$ and $0.001\mu F$ with an inductor of $5\ \mu H$ in its feedback circuit. Calculate the frequency of oscillations and also sketch the circuit diagram of appropriate oscillator.
5. An amplifier with positive feedback has a constant amplifier gain without feedback as $A = 20$. The gain of the amplifier with feedback $A_f = 200$. Calculate the feedback network gain β.

5 Marks

1. Using suitable diagram and mathematical expressions illustrate the operation of voltage series feedback amplifier.
2. Calculate the frequency of oscillations of an oscillator circuit with two capacitors of values 0.01μF and 0.001μF and an inductor 5μH in the feedback network. Also sketch the circuit diagram of appropriate oscillator.
3. Outline the circuit diagram for RC phase-shift oscillator and discuss its operation.

6 Marks

1. Discuss the concept of series voltage negative feedback with a block diagram and derive an expression for closed loop voltage gain.

8 Marks

1. Draw the block diagram of series voltage negative feedback amplifier and derive its closed loop voltage gain. State any two advantages of the circuit.

2.With neat circuit figure and relevant equations, explain the working of an RC phase shift oscillator. Mention ant two advantages and disadvantages of the same.

3.With neat circuit figure and relevant equations, explain the working of a Colpitts oscillator. Mention ant two advantages of the same.

4.With neat circuit figure and relevant equations, explain the working of a Hartley oscillator. Mention ant two advantages of the same.