

University Important Questions

16 Mark Questions

Unit I

1. With neat diagrams explain the working of a PN junction diode in forward bias and reverse bias and plot the V-I characteristics. (10)
2. Explain the switching characteristic of PN junction diode. (6)
3. Discuss about the effects of temperature on PN junction diode's Forward and Reverse characteristics. (8)
4. (i) Explain V-I characteristics of Zener diode. (8)
(ii) 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)
5. Briefly explain about avalanche and zener breakdown. (8)
6. Explain the working of Bridge rectifier. Give the expressions for V_{dc} , I_{rms} , I_{Lmax} and V_{rms} , PIV rating, ripple factor and efficiency.
7. Describe the working principle of full wave rectifier with centre tapped transformer and derive the expressions for the ripple factor, efficiency, V_{dc} , I_{rms} , I_{Lmax} and V_{rms} .
8. With a neat sketch explain the operation of CLC (ie π section) and LC filter.
9. Explain the following regulator circuits:
 - (i) Transistorized shunt regulator. (8)
 - (ii) Zener diode shunt regulator. (8)
10. (i) With neat diagram explain the construction and working of LED. (8)
(ii) Explain the working of LCD seven segment displays using square wave supply. (8)
11. Discuss about Drift and Diffusion current in detail. (8)

Unit II

1. Draw and explain the input and output characteristics of a transistor in CE configuration. (16)
2. (i) Explain the operation of Power transistor. (8)
(ii) Describe two applications of BJT. (16)
(RF Amplifier, Transistor as a Switch)
3. Draw and explain the input and output characteristics of a transistor in CB configuration. (16)
4. (i) Explain the working of NPN and PNP transistor. (10)
(ii) With neat diagram, describe the principle and working of Optocoupler. (6)
5. With necessary circuit and waveform, explain the switching characteristics of a transistor in detail. (8)
6. Distinguish between the different types of transistor configurations with necessary circuit diagrams.
7. Draw and explain the input and output characteristics of a transistor in CC configuration. (16)
8. Derive the expression for A_i , A_v , R_i and R_o for CB amplifier using h-parameter model.

9. Derive the equations for voltage gain, current gain, input impedance and output admittance for a BJT using low frequency h-parameter model for
 - (a) CE configuration
 - (b) CB configuration and .
10. Describe the methods of determination of h-parameters from its Input and output static characteristics. (8)
11. (i) The h-parameters of a transistor are given below. The source and load resistances of a CE amplifier are equal to $2\text{ k}\Omega$. Compute A_v , R_i and R_o .
 (ii) If the common-emitter h –parameters of a transistor are given by $h_{ie} = 2000$, $h_{fe} = 49$, $h_{re} = 5.5 \times 10^{-4}$ and $h_{oe} = 2.5 \times 10^{-5}$, find the common base h-parameters of the transistor.

Unit III

1. Explain the construction, working and operating characteristics of N-Channel JFET's with relevant diagrams.
2. Explain with the help of neat diagrams, the structure and working principles of a N-channel Depletion mode MOSFET.
3. Explain the operation of enhancement mode MOSFET with neat diagram and compare it with JFET.
4. Describe the construction and explain the operation of depletion mode MOSFET. Also draw the static characteristics.
5. (i) Explain the performance of FET as a voltage variable resistor
 (ii) Define and explain the three parameters of a JFET give the relation between them.
6. Draw and explain the small signal Low frequency model of Common drain amplifier.
7. Discuss in detail about the following
 - (i). Cascade amplifier
 - (ii). Cascode amplifier
8. Describe the kind of operation that takes place in the enhancement mode MOSFET. How does this differ from depletion mode type?
9. Obtain the high frequency model of the following amplifier
 - (i). Common source amplifier
 - (ii) Common drain amplifier.
10. Draw the circuit diagram of common source FET amplifier and give the design steps to find the component values used in the circuit.
11. Discuss on the following
 - (i). Darlington connection
 - (ii). Small signal model of a FET

Unit IV

1. What do you understand by Differential amplifiers? Draw the circuit diagram and explain the working of Differential amplifier. Explain the circuit operations in CM and DM.
2. Derive the equation for differential mode gain and common mode gain of a differential amplifier.
3. Explain the effects of negative feedback in amplifiers. (8)
4. Discuss the various topologies of feedback amplifier. (8)

5. Draw the circuit diagram of a current series feedback amplifier and derive expressions for voltage gain with and without feedback.
6. Draw the block diagram of a voltage series feedback amplifier and derive the equation for input impedance, output impedance and the voltage gain. (10)
7. Calculate the voltage gain, input and output resistances of a voltage series feedback amplifier having $A_v = 300$, $R_i = 1.5 \text{ k}$, $R_o = 50 \text{ k}$ and $\beta = 1/15$.
8. Draw the circuit of a Hartley oscillator and derive the condition for the frequency of oscillation. (12)
9. Differentiate oscillator with amplifier. (4)
10. Draw the circuit diagram and explain the operation of the following Oscillators
 - (i) RC phase shift oscillator. (8)
 - (ii) Any one LC oscillator. (8)
11. Discuss the operation of a Colpitts oscillator in detail. (8)
12. Briefly discuss the effect of negative feed back on amplifier stability and bandwidth.
13. Explain the principle of operation of a crystal oscillator and give its application.

Unit V

1. Sketch the response of the RC high-pass filter inputs for the following, and explain. (8)
 - (1) Ramp
 - (2) Pulse.
2. What is a clipper and clamper? Explain the concept of a positive clipper and a clamper.
3. What do you understand by clamping circuits? Discuss with the help of waveforms, the operation of a clamping circuit to clamp a sine wave input positively at 0 V.
4. With a neat sketch, explain the working of an astable multivibrator.
5. With a neat sketch, explain the working of a Bistable multivibrator.
6. With a neat sketch, explain the working of a Monostable multivibrator.
7. Explain the difference between the three types of multivibrators.
8. Explain the operation of an UJT and draw the VI characteristics.
9. Draw the circuit diagram of Schmitt trigger circuit and explain its operation with waveforms.
10. Explain the working of UJT based saw tooth oscillators.
11. Explain about the triggering methods for Bistable multivibrator.