

EC 151: FUNDAMENTAL OF ELECTRONICS AND COMMUNICATION

CREDITS =6 (L=4,T=0, P=2)

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| 1 | Diodes and its applications: Review of Semiconductor theory, PN junction diode. characteristic equation of diode, Temperature dependence of diode, Diode resistance and capacitance, Diode switching times, Diode rectifiers ,Diode clipping circuits, Diode clamping circuit ,Voltage doublers circuits. Rectifier performance analysis. Filters, LC, CLC and RC filters. Zener diode and voltage regulation, Light Emitting diode and Schottky diode. | 6 Hours |
| 2. | Transistor and Biasing Circuits: Review of transistor theory and operations, Derivation of generalized equations, Common Emitter, Common Base, Common collector characteristics and comparison, DC Load line and bias point, Various biasing circuits for transistors ,Thermal stability and stability factor | 6 Hours |
| 3 | Transistor amplifiers, models and Analysis: Amplifier gain input and output impedance, small signal amplifiers and analysis, H-parameter model and analysis, Frequency response analysis of amplifier (Low frequency and High frequency),Multistage amplifier, Gain relationship, Methods of coupling , RC coupled and Direct coupled BJT amplifiers, Darlington pair, Cascode amplifier, Transformer limitations | 8 Hours |
| 4 | Power Amplifiers: Transistor power dissipation, Heat transfer in semiconductor devices, Amplifier classes and efficiency, Class A amplifier, Class B amplifier, Push-pull amplifier ,Harmonic distortion and feedback, Crossover distortion ,Class AB operation , Push-pull amplifier without transformer, Class C Amplifier and Class D Amplifier, Comparative Study of Power amplifiers. | 8 Hours |
| 5 | Feedback Amplifiers and oscillators: Loop gain, Negative feedback amplifier, Various feedback Amplifier configuration, Effect of feedback on bandwidth and gain, AF sinusoidal oscillators, Realization of phase shift oscillator, Various circuit of RC phase shift network ,RF sinusoidal oscillators ,LC tuned oscillators, Frequency stability | 6 Hours |
| 6 | Introduction to electronic Communication: Analog communication system, Modulation schemes, Amplitude modulation, DSB, SSB, Frequency modulation, Phase modulation, Demodulation schemes, Demodulation principles, AM detectors FM detectors. | 6 Hours |

REFERENCE BOOKS

Title: Basic electronics :Devices Circuits and IT Fundamentals
Author: Santiram Kal
Publisher: Prentice Hall of India

Title: A First Course in Electronics
Author: Anwar A.Khan and Kanchan K. Dey
Publisher: Prentice Hall of India

Title: Electronic Communication systems
Author: Wayne Tomasi
Publisher: Pearson Education

LIST OF PRACTICALS

- 1 **Junction diode Characteristics**
 - To measure the effects of forward and reverse bias on current in a junction diode
 - To Determine experimentally and graph the voltage ampere characteristics of a junction diode
 - To test a junction diode with an ohmmeter
- 2 **Zener diode Characteristics**
 - To measure the effects of forward and reverse bias on current in a zener diode
 - To Determine experimentally and graph the voltage ampere characteristics of a zener diode
 - To construct a zener voltage regulator and experimentally determine the range over which the zener maintains a constant output voltage.
- 3 **The diode limiter and Clamper**
 - To determine the relationship between the input sinewave and output waveform of series and parallel connected diode limiters
 - To observe the effect on the output waveform of forward and reverse biased diode limiters
 - To observe the effect on the output waveform of negative and positive diode clampers
- 4 **Half wave and Full wave Rectification**
 - To observe and measure the output waveforms the output waveforms of a half wave rectifier
 - To observe and measure the output waveforms the output waveforms of a full wave rectifier
 - To obtain ripple factor and rectification efficiency for half wave and full wave rectifier.
- 5 **Transformer power supply and filter:**
 - To measure the effects of filter elements on the DC output voltage and ripple
 - To test and compare the effectiveness of (a) capacitor filter (b) π -filter
- 6 **Transistor Familiarization:**
 - Data sheet study of transistor
 - To become familiar with transistor biasing
 - To measure the effects on emitter base current of forward and reverse bias in the emitter base circuit.
 - To measure the effects on collector current of forward and reverse bias in the emitter base circuit.
 - To measure I_{CBO} .
- 7 **Current gain β in a common emitter configuration:**
 - To measure the effects on I_c of varying I_B .
 - To determine β .

- 8 **Common –Emitter Amplifier biasing and gain:**
- To connect a transistor as a CE ac amplifier using voltage divider bias
 - To measure the voltage gain of a CE amplifier
 - To observe the effect of an emitter bypass capacitor on amplifier gain
- 9 **The emitter follower(Common Collector Amplifier):**
- To measure the input and output impedances of an emitter follower.
 - To measure the power gain of the amplifier.
 - To observe the phase relationship between the input and output signal voltage.
- 10 **Cascaded Transistor Amplifier:**
- To determine the range of linear operation of an RC Coupled two stage amplifier.
 - To observe the phase relationships at the input and output of each stage in the amplifier.
 - To find the bandwidth of amplifier
- 11 **Push-pull Amplifier:**
- To define class B operation
 - To connect and signal trace a push-pull power amplifier.
- 12 **RC Phase Shift oscillator:**
- To determine the range of frequency variation of an RC-Phase shift oscillator
 - To compare the phase of output and feed back voltages in oscillator.
- 13 **Amplitude modulation and demodulation:**
- Observe the amplitude modulated wave
 - To find the modulation index
 - To demodulate the signal.
- 14 **Frequency modulation and demodulation:**
- Observe the frequency modulated wave
 - To demodulate the signal
15. **Study of FDM and TDM:**
- Study of Frequency division multiplexing and demultiplexing.
 - Study of Time division multiplexing and demultiplexing