III ECE LICA Q.B

UNIT-1

1. Define the terms input offset voltage, output offset voltage and input offset current, CMRR and PSRR for an OpAmp.
2. Derive the expressions for voltage gain of OpAmp in inverting and non inverting mode in closed loop configuration.
3. Draw the pin diagram of IC 741 and list out the characteristics of an ideal operational amplifier and also discuss briefly about various manufacturers and their designations with examples.
4. What is a regulator? Discuss three terminal regulators and their importance.
5. Define input offset voltage, output offset voltage and input offset current. Give various temperatures ranges for an op-amp.
6. Draw the block diagram of an Op-Amp and explain the function of each block.
7. What is the need for a regulator? What voltage options are available in 78XX & 79XX voltage regulators?
8. Design a dual power supply using suitable 3 terminal regulator ICs.Draw the pin diagram of IC 741 and list out the variants of 741 and their features.
9. Explain the procedure to measure any four parameters of an Opamp.
10. Define and describe the terms Slew rate, CMRR and PSRR for an Op-amp with typical values.
11. What is a regulator? Discuss three terminal regulators 78XX and 79XX.
12. Show the standard representation of IC regulators and explain how current boosting is achieved in regulators.
13. Define the terms input offset voltage, output offset voltage and input offset current, Slew rate and PSRR for an OpAmp.
14. In closed configuration, derive the expressions for voltage gain of an Op-amp in inverting and non inverting modes.
15. Design a dual power supply using suitable 3 terminal regulator ICs.
16. What is a regulator? Discuss three terminal regulators and their importance.
17. Draw the block diagram of an Op-Amp and explain the function of each block.
18. Derive the expressions for voltage gain of Op-amp in inverting and non inverting mode when connected in closed loop configuration.
19. What is the need for a regulator? Show the standard representation of IC regulators and explain how current boosting is achieved in regulators.
20. Design a dual power supply using suitable 3 terminal regulator ICs.

UNIT-2

1. Sketch the voltage to current converter circuit using operational amplifier and explain its operation.
2. Draw the circuit diagrams of Integrator and differentiator using op-amp and derive the expressions for output voltage.
3. With neat diagrams, explain the operation of Inverting comparator using operational amplifier.
4. With neat diagrams, explain the operation of Non-Inverting comparator using operational amplifier.
5. Explain the operation of log amplifier using operational amplifier.
6. Explain the importance of an Instrumentation Amplifier with necessary block diagram.
7. Describe how operational amplifier is used as Triangular wave generator
8. Explain the operation of square wave generator by drawing the capacitor and output voltage waveforms.

9. Write the important features of Instrumentation Amplifiers discuss the importance of an Instrumentation Amplifier in an instrumentation system.
10. Show the symbolic representation of building blocks used in analog computer and explain briefly.
11. Describe how the Triangular wave can be generated using op-amp.
12. With neat diagrams, explain the operation of non- Inverting comparator.
13. Draw a sample and hold circuit and explain its operation and uses.
14. Discuss the features and applications of LM380, a monolithic power amplifier.
15. With neat diagrams, explain the operation of Inverting comparator using operational amplifier.
16. Draw the circuit diagram of a Schmitt trigger using Op-Amp and explain the operation with neat waveforms.
17. Draw the circuit diagrams of Integrator and differentiator using op-amp and derive the expressions for output voltage.
18. Show the symbolic representation of building blocks used in analog computer and explain briefly.
19. Describe how a square wave can be generated using op-amp.
20. With neat diagrams, explain the operation of non- Inverting comparator.

UNIT-3

1. Define an electronic filter and explain how the filters are classified. List out the advantages of active filters over passive filters and draw the frequency response curves of some commonly used active filters.
2. Design a first order low pass Butterworth filter with pass band gain of 2 and cutoff frequency of 1KHz.
3. Sketch the circuit of second order high pass active filter and explain its operation.
4. Design a second order Butterworth high pass filter having lower cut-off frequency of 2 KHz and pass band gain of 4.
5. Define an active filter and explain how the filters are classified. What are the advantages of active filters over passive filters? List out the design steps to design a filter.
6. Design the first order high pass filter with pass band gain of 2 and lower cut-off frequency of 2 KHz.
7. Design a second order Butterworth low-pass filter having an upper cut-off frequency of 1 kHz. If required assume necessary data.
8. Explain how a wide band pass filter can be constructed by the use of a low-pass and a high-pass filters?
9. Discuss the classification of filters and mention the advantages of active filters over passive filters. What are the design steps to design a filter?
10. Design a first order low pass Butterworth filter with pass band gain of 2 and cutoff frequency of 2KHz.
11. Explain how a band pass filter can be constructed by the use of a low-pass and a high-pass filters?
12. Design a second order Butterworth high pass filter having lower cut-off frequency of 1 KHz.
13. List out the advantages of active filters over passive filters. What is an all pass filter? Mention the applications of All pass filters.
14. Design the first order high pass filter with pass band gain of 2 and lower cut-off frequency of 1.5 KHz.
15. Design a second order low pass filter with cut-off frequency of 1.5 KHz. Assume necessary data.

16. What is a notch filter? Explain with neat circuit diagram.
17. Discuss the disadvantages of passive filters. What is the roll- off rate of first order and second order active filters.
18. Design a first order low pass Butterworth filter with pass band gain of 2 and cutoff frequency of 2KHz.
19. Design a second order Butterworth high pass filter having lower cut-off frequency of 4 KHz.
20. What is a band reject filter? Explain with neat circuit diagram.

UNIT-4

1. Sketch the block diagram of 555 Timer and explain each block in it.
2. List out the applications of 555 Timer in monostable mode and explain about missing pulse detector.
3. Draw the block schematic of the PLL and explain the function of each block in it.
4. Explain the use of PLL as FSK demodulator.
5. Explain how a 555 Timer can be used as an Astable multivibrator?
6. Describe how the 555 timer in Astable mode can be used as FSK generator.
7. Explain about phase detector and low pass filter in a PLL system.
8. Draw the pin diagram of VCO and discuss the applications of VCO.
9. Draw the functional diagram of Monostable multi vibrator using 555 timer and explain its operation.
10. Describe the applications of 555 timer in mono-stable mode with suitable diagrams
11. Draw the basic block diagram of PLL and explain its working principle.
12. With the help of neat block diagrams, explain the applications of PLL as of frequency multiplier and frequency translator.
13. Sketch the functional block diagram of 555 Timer and explain each block in it.
14. Draw the functional diagram of Astable multi vibrator using 555 timer and explain its operation.
15. Explain about phase detector, low pass filter and VCO in a PLL system.
16. Discuss any 3 applications of PLL with suitable diagrams.
17. With the help of circuit diagram, explain how 555 timer is used as Schmitt Trigger?
18. Draw the pin diagram of 555 Timer. Discuss the applications of 555 Timer in Astable mode.
19. What is the basic working principle of PLL? Discuss different modes of operation of PLL.
20. Discuss the applications of PLL as AM, FM and FSK demodulator.

UNIT-5

1. Discuss about the R-2R ladder DAC and write the advantages of it.
2. What are the disadvantages of R-2R ladder DAC and discuss how they are eliminated with a neat circuit diagram.
3. What are the disadvantages of R-2R ladder DAC and discuss how they are eliminated with a neat circuit diagram.
4. With the necessary circuit diagram, explain the operation of Inverted R-2R ladder DAC.
5. Discuss the advantages and disadvantages of Binary weighted resistor DAC, R-2R ladder DAC and inverted R-2R ladder DAC.

6. Explain Successive approximation type ADC technique with neat diagram and suitable examples.
7. Draw the circuit diagram of simple weighted resistor DAC and explain its operation.
8. What are the advantages and disadvantages of simple weighted resistor DACs and explain how the disadvantage is eliminated with a neat circuit diagram.
9. Describe parallel comparator type ADC with neat diagram and discuss its advantages and disadvantages.
10. Write short notes on a)Linearity b) Monotonicity c)Resolution of a DAC/ADC
11. Describe how the R-2R ladder DAC is better than binary weighted resistor DAC? Discuss with the help of circuit diagrams.
12. Describe flash type ADC with neat diagram and discuss its advantages and disadvantages.
13. Define and discuss the terms with suitable diagrams a)Linearity b) Monotonicity c)Resolution of a DAC/ADC
14. Why is an inverted R-2R ladder DAC better than R-2R ladder DAC? Discuss with the help of circuit diagrams.
15. Explain the operation of counter type ADC with a neat block diagram.
16. What are the advantages and disadvantages of counter type A/D converter? Explain how they are eliminated with th help of a neat block diagram.