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VINAYAKA MISSIONS UNIVERSITY
VMKV ENGINEERING COLLEGE, SALEM
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
QUESTION BANK

SUBJECT: LIC & IT'S APPLICATIONS
CLASS/SEM/DEPT: III YEAR / V SEM / ECE (COMMON TO ECE & ETCE)

UNIT I
PART A

1. Define an operational amplifier.
2. Mention the characteristics of an ideal op-amp.
3. What happens when the common terminal of V^+ and V^- sources is not grounded?
4. Define input offset voltage.
5. Define input offset current. State the reasons for the offset currents at the input of the op-amp.
6. Define CMRR of an op-amp.
7. What are the applications of current sources?
8. Justify the reasons for using current sources in integrated circuits.
9. What is the advantage of widlar current source over constant current source?
10. Define slew rate. What does it signify
11. Draw a neat sketch showing the frequency response of op-amp 741 .
12. What is frequency compensation.
13. What is differential amplifier and list the types.
14. Define Linear IC. State its advantages.
15. Differentiate linear IC from Digital ICs.
16. Define Current Source.
17. Draw the internal Block of an Op-Amp.
18. What are the Different Linear IC packages?
19. Why is R_E is replaced by a constant current bias circuit in a Difference Amplifier?
20. What is the advantage of using Active load in Difference Amplifier?
21. Compare Constant Current bias and Current mirror Methods.
22. What are the Techniques available to compensate the Variation in CMRR?
23. What are the advantages of Band gap Reference Circuit?
24. List the types of Frequency Techniques Available.
25. What are the causes of Slew Rate?

PART B

1. Explain the working of a Current Source with a circuit diagram.
2. Explain the operation of a basic differential amplifier.
3. Draw the circuit diagram of a symmetrical emitter coupled difference amplifier and show that a very high CMRR will result if the difference amplifier is supplied by a constant current bias.
4. Draw and explain the circuit diagram of a basic current mirror and improved current mirror circuit.
5. a) What are the ideal characteristics of Op-amp
b) Explain band gap reference circuit
6. Explain the frequency compensation Techniques used in operational amplifiers.
7. Explain the differential amplifier circuit with active load to improve Common mode gain.
8. Explain in detail Widlar Current Source.

9. Explain supply independent biasing using zener referenced bias circuit.
10. Draw and explain in detail about Slew rate and methods of improving slew rate.

UNIT II

PART A

1. Mention two characteristics of Instrumentation Amplifier.
2. Mention two applications of Schmitt Trigger.
3. State the disadvantages of passive filters.
4. Draw an integrator circuit using op-amp .
5. Write the advantages of active filter over passive filter.
6. Draw the circuit diagram of full wave precision rectifier.
7. What are the areas of application of non-linear op-amps circuits?
8. What are the limitations of the basic differentiator circuit?
9. Derive the gain of an op-amp Buffer.
10. What are AF and RF op-amp Oscillators? Give examples.
11. What is an Op-amp Buffer? State its advantages.
12. Draw the differentiator circuit using Op-Amp.
13. Draw and mention the equation for Non-inverting summing amplifier.
14. Draw and mention the equation for Adder- Subtractor circuit using Op-Amp.
15. Mention some of the linear applications of op -- amps
16. Mention some of the non – linear applications of op-amps
17. What are the applications of V-I converter?
18. What do you mean by a precision diode?
19. Write down the applications of precision diode.
20. List the applications of Log amplifiers
21. Draw the Inverting and Non Inverting Amplifier Circuits.
22. What is Multivibrator and list its types.
23. Draw the Circuit of a full wave rectifier.
24. Write the expression for Log and Anti Log Amplifier.
25. Differentiate between astable and monostable Multivibrator.

PART B

1. Explain the working principle of RC phase shift oscillator with neat sketch.
2. Explain the working of:
 - i. Schmitt trigger
 - ii. Comparator
3. Derive the Closed Loop voltage gain equation for Inverting and Non Inverting Amplifier.
4. Explain the working of
 - (i) Voltage to Current Converter
 - (ii) Triangular Wave Generator
5. Explain Instrumentation Amplifier with a neat diagram and derive its gain.
6. Discuss in detail the operation of Astable Multivibrator.
7. Discuss in detail the operation of Monostable Multivibrator.
8. Explain the following op amp applications with a neat circuit diagram and derivations:
 - (i) Integrator
 - (ii) Differentiator
9. Draw a neat Op-Amp Low pass Butterworth filter and derive the design equations.
10. A) Derive an expression for the output voltage of op-amp anti-log amplifier.
B) Derive an expression for the output voltage of op-amp log amplifier.

UNIT III
PART A

1. What is amplitude modulation.
2. Define lock range
3. What is a two quadrant multiplier.
4. With reference to a VCO, define voltage to frequency conversion factor K_v .
5. What is a four quadrant multiplier.
6. Define capture range of a PLL.
7. Name two applications of PLL.
8. What is a voltage controlled oscillator.
9. Define Comander and its purpose.
10. Mention some areas where PLL is widely used.
11. Define Lock-in range of a PLL.
12. Compare the features of digital multiplier with analog multiplier.
13. List down the important electrical characteristics of 565 PLL.
14. Draw a neat block diagram of VCO.
15. What are the advantages of Comander IC.
16. List the basic building blocks of PLL
17. What are the three stages through which PLL operates?
18. Give the classification of phase detector
19. What is a switch type phase detector?
20. What are the problems associated with switch type phase detector?
21. What is a voltage controlled oscillator?
22. Discuss the effect of having large capture range.
23. List the Applications of VCO.
24. Mention the Advantages of Frequency Synthesizers in Integrator Circuits.
25. Draw FSK De-Modulator circuit using IC565.

PART B

1. Briefly explain the block diagram of PLL and derive the expression for Lock range and capture range.
2. With a neat functional diagram, explain the operation of VCO. Also derive an expression for f_0 .
3. Analyze the Gilbert's four quadrant multiplier cell with a neat circuit diagram. Discuss its applications.
4. Briefly discuss the applications of PLL
5. Explain AM modulator and demodulator
6. Explain PM modulator and demodulator
7. Explain FSK modulator and demodulator
8. Explain frequency synthesizers with a neat Diagram.
9. Analyze the variable transconductance multiplier with a neat circuit diagram. Discuss its applications.
10. Compare PM, AM and FSK modulators.

UNIT IV
PART A

1. What is Sample and Hold Circuit?
2. What is Digital to Analog converter and Classify it.
3. How many comparators are required to build an n bit flash type A/D converter.
4. Why is the R-2R ladder network DAC better than weighted resistor DAC.
5. Which type of ADC is used in all digital voltmeters.
6. Define monotonicity with respect to D/A converter.
7. List the Applications of Sample and Hold Circuits.
8. Define Settling time of DAC.
9. What is granular noise.
10. List advantages of ADM.
11. Explain in brief the principle of operation of successive approximation ADC.
12. Mention the Advantages of sample and hold circuit.
13. Which is the simplest DAC? Why?
14. Why MOSFET is used in Op-amp Sample and Hold circuit.
15. What are the parameters of ADC and DAC? List them.
16. What is Delta Modulation?
17. Classify Different types of Voltage to frequency converters.
18. Compare Single slope and Dual slope converters.
19. List out some integrating type converters.
20. What is integrating type converter?
21. Define conversion time.
22. Define accuracy of converter.
23. Give some specification for Voltage to frequency converter.
24. Define Offset Error and Linearity Error.
25. Define Quantization Error.

PART-B

1. What is integrating type converter? Explain the operation of dual slope ADC
2. Explain the principle of operation of successive Approximation ADC.
3. With neat sketch explain the operation of sample and hold circuit.
4. Explain the various types of digital to analog converters.
5. What is delta sigma modulation? Explain the A/D conversion using Delta modulator
6. Explain delta modulation with neat diagram.
7. Explain flash type ADC with diagram.
8. Draw and explain voltage to time and Voltage to frequency converters.
9. Explain in detail about various analog switches.
10. Explain Binary weighted resistor DAC

UNIT V
PART A

1. Name a timer IC and a voltage regulator IC.
2. Define ripple rejection with respect to voltage regulators.
3. Why is that a switching regulator has a higher efficiency than a series regulator.
4. What is the roll off rate for a third order low pass filter.
5. Name the two packages in which IC 555 timer is available.
6. Why do switching regulators have better efficiency than the series regulators.
7. Define line regulation.
8. What is noise.
9. What is shot noise.
10. List the main features of timer IC 555.
11. Draw the PIN Diagram of IC 555 Timer.
12. What is an Isolation amplifier.
13. Define voltage regulation. Calculate its percentage for an ideal voltage regulator.
14. What are the types of noises that are introduced in op amp.
15. What is Linear mode power supply?
16. What is an optocoupler? State its advantages.
17. List the application of Astable multivibrator using IC 555.
18. Define duty Cycle.
19. What is tuned amplifier?
20. Mention the characteristics of voltage Regulator.
21. Classify the types of voltage regulator.
22. List the advantages of Switched capacitor.
23. What is an power amplifier and classify its types.
24. Draw the waveform of Class C Amplifier.
25. Draw the block diagram of fiber optic network.

PART-B

1. What is 555 timer? What are the features of 555 timer? Explain the monostable mode in detail?
2. Explain the Astable mode of operation using 555 timer.
3. Explain in detail about Class A and Class B Power Amplifiers.
4. Explain in detail the 723 IC general purpose voltage regulator.
5. Draw and explain the operation of switching regulators. Give its advantages.
6. Explain the functional diagram of LM 380 power amplifier.
7. Explain tuned amplifier with neat diagram.
8. Briefly discuss in detail about video amplifier with neat sketch.
9. Explain opto-coupler in detail.
10. With neat diagram explain isolation amplifier.