LINEAR INTEGRATED CIRCUITS (BECE1-516)

Question bank

1. What are the advantages of an IC over discrete components?
2. State an Monolitihic ICs
3. What is the maximum undistorted amplitude ,that a sine input of 10kHz ,can produce ,at the output of opamp whose slewrate is 0.5 V/ps?
4. Compare the features of monolithic & hybrid technologies.
5. What are the different types of packaging techniques of Ics?
6. What are the advantages of an active load?
7. What is the need of a level translator in an opamp?
8. What are voltage references?
9. Explain the concept of virtual ground.
10. Draw the inverting and non-inverting amplifier with corresponding input & output waveforms for the same.
11. Define CMRR.
12. List the methods of realizing high Ri in a differential amplifier?
13. Define PSRR.
14. What are the ideal characteristics of op-amp?
15. Draw the equivalent circuit of practical op-amp?
16. Write the gains of inverting and non-inverting op-amp?
17. What is a differential amplifier?
18. What is difference mode and common mode gains?
19. Draw the block diagram of Operational Amplifier.
20. What is input bias current?
21. Define unity gain bandwidth of an opamp.
22. What is input offset current?
23. What is input offset voltage?
24. Define thermal drift.
25. Define slewrate.
26. What does the term roll off mean?
27. Compare the performance of inverting and non inverting operational amplifier Configurations.
28. Explain the integral circuit diagram of IC741.Discuss its AC and DC performance characteristics.
29. Derive expressions for outputs, input impedance and gain for an inverting amplifier.
30. Explain the need of large CMRR value. How is it achieved? Explain in detail and derive the expression for CMRR in a differential amplifier using opamp?
31. Explain the difference between constant current source and current mirror.
32. Compare different configurations of Differential amplifier.
33. Explain in detail the inverting & non-inverting amplifier and derive the expression for closed loop gain.
34. For a dual input, balanced output differential amplifier, Rc=2.2.KQ, RE=4.7KQ, Rsl=Rs2=50Q. The supply voltages are ±10V. the hf_e for the transistor is 50. Assume silicon transistors and hi_e =1.4KQ. Determine the operating point values, differential gain, common mode gain and CMRR.

35. In a non-inverting amplifier if R1=5KQ, Rf=20KQ& Vi=lV and RL=5KQ is connected at the output. Calculate output voltage, Load current and closed loop gain.
36. Explain slew rate and also explain the methods to improve slew rate?
37. Define offset voltage.Explain methods to nullify off-set voltage.
38. Give any four applications of a comparator.
39. What is a voltage follower?
40. What is the need for an instrumentation amplifier?
41. List the applications of Log amplifiers:
42. What are the limitations of the basic differentiator circuit?
43. Write down the condition for good differentiation and draw the circuit.
44. What are the applications of comparator?
45. What do you understand by an Integrator?
46. What is a filter?What are the demerits of passive filters and what are the advantages of active filters?Mention some commonly used active filters :
47. What is the most important application of a Schmitt trigger circuit?
48. What are the requirements for producing sustained oscillations in feedback circuits?
49. Differentiate Schmitt trigger and comparator
50. What are the limitations of an ideal active differentiator?
51. Why integrators are preferred over differentiator?
52. Using an op-amp draw the circuit diagram of a phase shift oscillator.
53. What do you understand by instrumentation amplifier?
54. Draw the freq. response of the LPF, HPF, and BPF & BSF.
55. Explain the following applications of opamp
    i. Peak detector
    ii. V/I converter(Floating load & Grounded load)
    iii. Multiplier
    iv. Scale changer
    v. Inverter

56. Draw the circuit diagram and explain the working of an instrumentation amplifier. Mention the specific advantages of three op-amp instrumentation amplifier circuit.
57. Draw the circuit of a first order and second order butter worth active low pass filter and derive its transfer functions.
58. Draw the block diagram of PLL as frequency multiplier
59. A PLL frequency multiplier has an input frequency of "f ' and a decade counter is introduced in the loop. What will be the frequency of the PLL output?
60. Define lock range, Capture range and pull-in time in PLL.
61. What is VCO? What is the purpose of VCO? Draw the block diagram and connection diagram of IC 566 VCO and explain.
62. Define resolution and conversion time of DAC.
63. With a neat sketch, explain successive approximation ADC.Explain flash type, single type and Dual slope type ADC.
64. With a neat sketch, explain dual slope ADC
65. Discuss the operation of sample and hold circuit with circuit diagram
66. What is meant by line regulation & load regulation of a voltage regulator?
67. How does the control element in shunt regulator differ from that in series regulator?

68.What are the limitations of linear voltage regulator?
69.What are 3 terminal regulators? List its characteristics.
70.What are the external components required for a basic LM317 configuration?
71.What is switching regulator? What is the primary advantage of switching regulator over linear regulator?
72.Draw the circuit diagram of triangular wave generator and give the expression for its frequency of oscillation.
73.Explain the working of a saw tooth waveform generator. Explain the methods to obtain asymmetric square wave.