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Subject Title: Linear Integrated Circuits & Basics of Communication Prepared by: E Gayathri
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Unit - I: Operational Amplifiers

1. Define operational amplifier.
2. Define the terms CMRR, Slew rate Virtual ground , Offset errors.
3. What are the ideal characteristics of op-amp?
4. Explain the need for differential amplifier.
5. Discuss about Op-amp as differentiator, Integrator circuits.
6. Draw the block diagram of operational amplifier and explain in detail.
7. Explain the working of emitter coupled differential amplifier.
8. Discuss the working of operational amplifier as a summing amplifier and obtain the its output voltage.
9. Draw the circuit diagram of inverting and non -inverting amplifiers and explain their operation. Derive expressions for voltage gain.
10. Explain the comparator action of an op-amp.
11. Describe how op-amp is used as a Voltage follower.
12. Discuss the working of op-amp as Subtractor.
13. Problems based on all topics.

Unit - II: Applications of operational amplifiers

14. Draw the block diagram of IC-555 timer and describe its working.
15. Draw the circuit of Astable Multivibrator with IC -555 and explain.
16. List out the features of 555 timer.
17. Draw the circuit of Wein bridge oscillator with op-amp and obtain its frequency.
18. Explain how op-amp can be as a logarithmic amplifier with a diode.
19. With the help of a neat diagram explain how op-amp is used to generate a sine wave?
20. Draw the circuit diagram of a square Wave generator using op-amp and explain its operation.
21. Draw the circuit of Triangular wave generator using op-amp and explain
22. Explain the working of Monostable multivibrator using op-amp.
23. Explain with a neat diagram, how op-amp can be used to solve differential equations of second order.
24. Explain with relevant diagrams, how IC-555 timer is used as astable multivibrator.
25. Explain with the help of a circuit diagram how IC-555 timer is used as a monostable multivibrator.

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Unit - III: Modulation

26. What is Modulation?
27. What is the need for modulation?
28. Give advantages of AM.
29. Define modulation index of AM signal.
30. Derive the expressions for frequency spectrum of A.M wave.
31. What is AM? Show that an AM wave contains a carrier and two side bands for every modulating frequency.
32. Give the theory and working of diode detector to detect the AM signals.
33. Define Demodulation.
34. Explain the working of a simple amplitude modulator with relevant circuits.
35. Derive the expressions for total transmitted power of AM wave.
36. Explain the working of Balanced modulator circuit.
37. Explain the principle of AM detection and classify A.M. detectors.
38. Draw the circuit of envelop diode detector and explain graphically the conditions.
39. Draw the circuit diagram of square law diode modulator and explain its performance.
40. Problems based on all topics.

Unit - IV: Frequency modulation

41. Define frequency modulation.
42. Write the expressions for band width of FM Signal.
43. Give the advantages and disadvantages of FM.
44. Draw the block diagram of FM radio receiver. Explain the Significance of each block.
45. Write about Delta modulation.
46. Write about PAM, PCM?
47. Give the Analysis of Frequency modulation.
48. Compare AM and FM.
49. Draw the circuit of simple frequency modulator and explain its working.
50. Draw the block diagram of Super hetero dyne receiver and explain its working .
51. Explain the principle and working of ratio detector.
52. Derive the expression for spectrum of F.M. Wave.
53. Explain how FM waves are detected?
54. Give an account of classification of pulse modulation techniques.
55. Draw the block diagram of FM discriminator with circuit diagram.
56. Problems based on all topics.

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