

ST. JOSEPH'S COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)

CUDDALORE – 607001

PG & RESEARCH DEPARTMENT OF PHYSICS

SUBJECT: APPLIED ELECTRONICS

SUBJECT CODE: EPH613

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Section- A (2 marks)

1. Define FET.
2. What is the characteristics of SCR?
3. What is miller effect?
4. Define DC voltage follower.
5. Define OP amp logarithmic amplifier.
6. Write the principle of phase shift oscillator.
7. What is phase detector?
8. Define comparator.
9. Write the principle of DAC.
10. What is the difference between D/A and A/D convertor.
11. Distinguish FET with MOSFET.
12. Draw the symbolic diagram of SCR.
13. Define input impedance of an Op-Amp.
14. Define CMRR and state its significance.
15. What is comparator?
16. Write down the frequency formula of Wein bridge oscillator.
17. Define PLL.
18. What is an ADC?

19. Draw the block diagram of D/A converter.
20. Draw the symbolic diagram of SCR.
21. Define input impedance of an Op-Amp.
22. Write down the frequency formula of Wein bridge oscillator.
23. What is a FET? Draw the symbol of FET.
24. How a SCR acts as a switch?
25. Draw the circuit diagram of DC voltage follower.
26. What do you mean by logarithmic divider?
27. Define op-amp astable multivibrator.
28. What do you mean by the terms resolution and accuracy in D/A converter?
29. Define the drain resistance and amplification factor of a FET.
30. What are the salient features of an OP.AMP?
31. What is a voltage follower?
32. Draw the circuit diagram of OP. AMP subtractor.
33. What is the role served by VCO in a PLL chip?
34. Define Capture range and Pull-in-time.
35. What is resolution of a D/A converter?
36. What is holding current in a SCR?
37. Give any four characteristics of OP.AMP.
38. Define Common Mode Rejection Ratio.
39. What is the principle of logarithmic amplifier?
40. Distinguish between Bistable multivibrator and Schmitt trigger.
41. Name the pins of IC 555 Timer.
42. Define lock-in range of a Phase locked loops.
43. What is an accuracy of a D/A converter?

44. Differentiate between Analog and Digital signals.
45. What is UJT? Give its characteristics.
46. What is SCR? List any two applications of SCR.
47. Define PSRR and CMRR of an Op-Amp.
48. What is Miller effect in Op Amp?
49. List any four applications of Op-Amp.
50. Draw the schematic diagram of a comparator using Op-Amp and mention what is compared in the circuit.
51. What is monostable multivibrator? Mention its application.
52. What is VCO? Give its application.
53. What is DAC? Give its need in digital circuits.
54. What is ADC? List any two of its applications.

Section- B (5 marks)

1. a) Explain FET and VVR. (or) b) Explain MOSFET.
2. a) Explain PSRR? (or) b) Explain Ac, DC voltage follower.
3. a) Explain Schmitt trigger. (or) b) Explain Wein bridge oscillator.
4. a) Draw the 555 timer diagram and its explanation. (or) b) Explain voltage controlled oscillator.
5. a) If a 10-bit D/A converter has a range of 0 to 10 V and is always within 1mV of its ideal output. What is its linearity as a percent of full-scale range? (or) b) Explain 4 bit R-2R ladder DAC.
6. Describe the working of enhanced MOSFET with necessary diagram. (or) (b) Explain the working of UJT as relaxation oscillator with required circuit diagram.
7. a) Determine the CMRR of an operational amplifier for $V_d = 1\text{mV}$, $A_c = 12$ and $V_o = 8\text{V}$. (or) b) Calculate the output voltage of an Op-Amp summing amplifier, $R_3 = 1\text{M}\Omega$, $R_2 = 1\text{M}\Omega$ for $V_1 = 1\text{V}$, $V_2 = 2\text{V}$, $V_3 = 3\text{V}$, $R_1 = 500\text{k}\Omega$, $R_f = 1\text{M}$
8. a) Draw the circuit diagram of logarithmic multiplier and explain its working. (or) b) Explain the working of a logarithmic amplifier.

9. a) Explain the working of 555 timer acted as Schmitt trigger. (or) b) Discuss about the voltage controlled oscillator with neat diagram.
10. a) Explain the working of a stair case A/D Converter. (or) b) With a block diagram, explain the principle of weighted resistor D/A Converter.
11. a) Describe the working of enhanced MOSFET with necessary diagram. (or) (b) Explain the working of UJT as relaxation oscillator with required circuit diagram.
12. a) Draw the circuit diagram of logarithmic multiplier and explain its working. (or) b) Explain the working of a logarithmic amplifier.
13. a) i) When a reverse gate voltage of 15 V is applied to a FET, the gate current is 10^{-3} μ A. Find the resistance between gate and source? ii) When VGS of a FET changes from -3.1 V to -3 V, the drain current changes from 1 mA to 1.3 mA. What is the value of transconductance (Or) b) The intrinsic stand-off ratio for a UJT is determined to be 0.6. If the inter-base resistance is 10 K Ω , what are the values of RB1 and RB2?
14. a) With a circuit diagram explain op-amp adder. (Or) b) Explain the working of an op-amp integrator.
15. a) Discuss the operation of op-amp logarithmic amplifier. (Or) b) Explain the function of phase shift oscillator using op-amp.
16. a) Write a note on 555 Timer as Schmitt Trigger. (Or) b) Explain the working of voltage controlled oscillator.
17. a) Explain the working of a 4-bit binary weighted D/A converter. (Or) b) Draw the circuit diagram of staircase converter and explain
18. a) Describe the working principle of FET. (or) b) Explain the construction and characteristic curve of a SCR.
19. a) Explain the terms CMRR, Slew rate and input offset voltage. (or) (b) Explain with a circuit, the function of an OP.AMP adder.
20. a) Draw the circuit diagram of logarithmic divider and discuss its operation. (or) b) Explain how an operational amplifier can be used as a comparator.
21. a) Draw the block diagram of of a 8-pin DIP IC 555 Timer and explain its working. (or) b) Explain the basic principle of PLL.
22. a) Draw the circuit of 4-bit R-2R ladder D/A converter. (or) b) Explain the working of Stair case A/D converter

23. a) Explain the function of a UJT relaxation oscillator with waveforms. (or) b) Explain the construction and characteristic curve of a SCR.
24. a) Draw the circuit diagram of an inverting amplifier using OP.AMP and derive the expression for its voltage gain. (or) (b) Explain with circuit, the function of a differentiator using OP.AMP.
25. a) Draw the circuit diagram of logarithmic divider and discuss its operation. (or) b) Explain with a circuit, the working of monostable multivibrator using OP.AMP.
26. a) Explain how an Astable multivibrator is constructed using IC 555 Timer. (or) b) Discuss the function of a voltage controlled oscillator with its circuit.
27. a) Explain with necessary theory, the working of 4-bit binary weighted D/A converter. (or) b) Explain the working of Stair case A/D converter.
28. a) Draw a FET amplifier circuit and explain how a FET is working as amplifier. (or) b) Draw a relaxation oscillator circuit using UJT. Calculate the RC value to generate the frequency of 10 KHz. Explain its working.
29. a) With a neat circuit diagram explain the working of inverting amplifier using OP-AMP. Give the gain formula. (or) b) Design an OP-AMP subtractor circuit to subtract minimum of 0v and maximum of 9v from 9v. Also explain its working.
30. a) With a neat circuit diagram explain the working of Logarithmic divider using OP – AMP. (or) b) Explain the working of a Schmitt trigger using OP-AMP with the help of the circuit diagram.
31. a) With a circuit diagram explain the working of a digital phase detector. (or) b) Draw a circuit diagram of a VCO using IC 555 and explain its working.
32. a) Design a 4 bit R-2R ladder DAC and explain its working. (or) b) Discuss the merits and demerits of weighted resistor and R-2R and successive approximation ADC.

Section C (10 marks)

1. Write the principle of UJT characteristics and explain UJT as relaxation oscillator.
2. i) Explain CMRR. ii) Explain the solving simultaneous linear equation.
3. Briefly explain Astable, Monostable multivibrator.
4. i) Explain phase locked loop. ii) Explain Analog phase detector
5. Briefly explain successive approximation ADC

6. Explain the principle and working of FET as voltage variable resistor.
7. Discuss the working of an Op-Amp as a) Differentiator b) DC voltage follower
8. Discuss the working of an astable multivibrator using Op-Amp. Also derive the expression for the frequency of oscillation.
9. Explain the operation of 555 timer based monostable multivibrator in details.
10. Explain the operation of a 4 bit R-2R type D/A Converter and derive the expression for the output voltage.
11. Explain the construction and working of n-channel FET and discuss its output characteristics.
12. Give an experimental set up to solve the following simultaneous equations.
 $x + 2y = 3$ and $2x - y = 1$.
13. Explain the working of a Wein's bridge oscillator using op-amp. Obtain an expression for its frequency of oscillations.
14. Describe with a neat diagram the internal architecture of 555 Timer.
15. Discuss with necessary block diagram, the working of the successive approximation A/D converter.
16. Describe the construction, working and characteristics of UJT. How can a UJT be used to generate saw tooth waveforms?
17. Explain the following a) OP.AMP sign and scale changer b) OP.AMP averager.
18. Explain the working of the following circuits constructed using OP.AMP. a) Logarithmic amplifier and b) Anti-logarithmic amplifier.
19. Give the block diagram of Phase Locked Loop and explain its working.
20. Draw the circuit diagram of a 4-bit weighted resistor D/A converter and explain its working.
21. Describe the structure, principle of operation, drain characteristics of N-channel JFET.
22. Describe the procedure for solving a second order differential equation using analog circuit. How are the initial conditions set up?
23. Explain the construction, working of Wien's Bridge oscillator using OP.AMP.
24. Write notes on a) Analog Phase detector b) Digital Phase detector.

25. Discuss with necessary block diagram, the working of successive approximation A/D converter.
26. Draw the circuit to study the characteristics of SCR and explain the procedure to study the Characteristics with model graph.
27. Design an OP – AMP circuit to solve the following simultaneous equations. $2x+3y-6 = 0$, $6x+9y-3 = 0$.
28. Draw a circuit of Phase Shift and Wein Bridge oscillator using OPAMP and explain its working.
29. Draw the block diagram 555 timer and explain the working of each block.
30. With a neat circuit diagram explain the working of Stair case ADC.