

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Third Semester

Electronic Instrumentation and Control Engineering

24IXPC304 - ANALOG ELECTRONICS AND LINEAR INTEGRATED CIRCUITS

Regulations - 2024

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. The emitter region of transistor is _____ doped? (a) Lightly (b) Heavily (c) Either Lightly or Heavily (d) None of the mentioned	1	K1	CO1
2. Which configuration of BJT is known for providing the highest input impedance? (a) Common Base(CB) (b) Common Emitter(CE) (c) Darlington pair (d) Common Collector (CC)	1	K1	CO1
3. Due to the....., the n-channel MOSFET is considered better than p-channel MOSFET. (a) Faster operation (b) Lower noise level (c) Lower input impedance (d) TTL compatible	1	K1	CO2
4. Small-signal parameters of MOSFET are controlled by..... (a) Intersecting point (b) Q-point (c) Output voltage (d) Input voltage	1	K1	CO2
5. In class B amplifier, the output current flows for.... (a) less than half input cycle (b) more than half input cycle (c) half input cycle (d) entire input cycle	1	K1	CO3
6. Why does the cross over occur in push-pull circuits? (a) Both the transistors will be partially OFF during the zero crossing (b) More noise (c) Supply will be off (d) None of the mentioned	1	K1	CO3
7. Shunt-Shunt Feedback Systems, also known as.... (a) Voltage Series Feedback Amplifier (b) Current Series Feedback Amplifier (c) Voltage Shunt Feedback Amplifier (d) Current Shunt Feedback Amplifier	1	K1	CO4
8. Which type oscillations are produced by an oscillator? (a) Modulated (b) Damped (c) Un-damped (d) under damped	1	K1	CO4
9. The CMRR of an ideal op amp is..... (a) Infinite (b) Unity (c) Zero (d) Cannot predict	1	K1	CO5
10. The voltage regulator IC 723 contains _____ pins. (a) 3 (b) 8 (c) 10 (d) 14	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11. Explain why biasing is necessary for a transistor.	2	K2	CO1
12. Interpret the meaning of barrier potential in a PN junction.	2	K2	CO1
13. Contrast FET and BJT with respect to operation and characteristics.	2	K2	CO2
14. Outline the applications of a UJT in triggering and timing circuits.	2	K2	CO2
15. Demonstrate how the push-pull configuration improves amplifier efficiency.	2	K2	CO3
16. Summarize methods to eliminate crossover distortion.	2	K2	CO3
17. Classify the different types of sinusoidal oscillators based on frequency-selective networks.	2	K2	CO4
18. Explain the effect of feedback on noise in amplifier circuits.	2	K2	CO4
19. Illustrate the working of a differential amplifier with a neat block/circuit diagram.	2	K2	CO5

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| 20. Describe some nonlinear applications of op-amp circuits. | 2 | K2 | CO5 |
| 21. Explain what is meant by a switching regulator and its basic working principle. | 2 | K2 | CO6 |
| 22. Interpret the pin diagram of IC 555 timer and explain its major functions. | 2 | K2 | CO6 |

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

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| 23. a) Explain the unique voltage regulation property of a Zener diode different biasing conditions. | 11 | K2 | CO1 |
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| b) Describe the construction and operation of an NPN Bipolar Junction Transistor in the Common Base configuration and explain how it functions in this setup. | 11 | K2 | CO1 |
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| 24. a) Illustrate the construction of a Silicon Controlled Rectifier with suitable diagrams. | 11 | K2 | CO2 |
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| b) Explain the construction and working of an n-channel JFET. | 11 | K2 | CO2 |
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| 25. a) Apply the working principle of a transformer coupled Class B push-pull amplifier to analyze the circuit and derive the formula for its efficiency. | 11 | K3 | CO3 |
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| b) Explain the construction and operation of a series fed Class A amplifier, and apply circuit analysis to derive its efficiency. | 11 | K3 | CO3 |
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| 26. a) Apply your knowledge to draw the circuit diagrams of voltage series and voltage shunt feedback amplifiers. Describe their operating principles and analyze the circuits to derive the expression for gain with feedback. | 11 | K3 | CO4 |
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| b) Identify the key components of the Hartley oscillator circuit and analyze how each contributes to the oscillation process and frequency determination. | 11 | K3 | CO4 |
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| 27. a) Construct circuit diagrams of the non-inverting and inverting amplifiers, analyze their operation, and derive the expressions for their voltage gain with detailed explanation. | 11 | K3 | CO5 |
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| b) Develop detailed waveform sketches for both types of clippers and examine how diode direction influences the clipping level. | 11 | K3 | CO5 |
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| 28. a) Build an explanation of the 555 timer's block diagram by describing the purpose of comparators, flip-flop, and output stage. | 11 | K3 | CO6 |
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| b) Construct a simplified block-level explanation of the IC-723 and describe how it regulates the output voltage. | 11 | K3 | CO6 |
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