SNS COLLEGE OF TECHNOLOGY

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COIMBATORE-641 035, TAMIL NADU

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code & Name : **23ECB203 LINEAR INTEGRATED CIRCUITS**

Course Faculty : **Ms.V.Aishwarya-AP/ECE**

Question Bank

Unit – I : BASICS OF OPERATIONAL AMPLIFIERS

Part A – 2 Mark Questions

S.No	Question	Bloom's Level	Industry Reference/Gate	Course Outcome
1	Define an operational amplifier.	BL1 – Remember	Texas Instruments	CO1
2	List the ideal characteristics of an op-amp.	BL1 – Remember	Analog Devices	CO1
3	What is meant by open-loop gain of an op-amp?	BL2 – Understand	GATE EC	CO1
4	Define input offset voltage.	BL1 – Remember	IC 741 Datasheet	CO1
5	What is input bias current?	BL1 – Remember	Precision Amplifiers	CO1
6	Define input offset current.	BL1 – Remember	Op-Amp Design Guides	CO1
7	What is slew rate of an op-amp?	BL1 – Remember	GATE EC	CO1
8	Define Common Mode Rejection Ratio (CMRR).	BL2 – Understand	Instrumentation Systems	CO1
9	What is frequency response of an op-amp?	BL2 – Understand	Signal Conditioning	CO1
10	Mention any two limitations of IC 741.	BL2 – Understand	Industrial Op-Amps	CO1
11	Define gain-bandwidth product.	BL1 – Remember	Analog IC Design	CO1
12	What is Power Supply Rejection Ratio (PSRR)?	BL1 – Remember	Power Electronics	CO1
13	What is thermal drift in op-amps?	BL2 – Understand	Industrial Electronics	CO1
14	Define output offset voltage.	BL1 – Remember	IC Datasheets	CO1
15	What is differential input voltage?	BL1 – Remember	Analog Systems	CO1
16	State the importance of high input impedance.	BL2 – Understand	Sensor Interfaces	CO1
17	What is noise in operational amplifiers?	BL1 – Remember	Medical Electronics	CO1
18	What is saturation voltage of an op-amp?	BL1 – Remember	Amplifier Design	CO1
19	List any two applications of operational amplifiers.	BL1 – Remember	Industrial Automation	CO1
20	What is unity gain bandwidth?	BL1 – Remember	GATE EC	CO1

Part B Questions

S.No	Question	Bloom's Level	Industry Reference/Gate	Course Outcome
1	Explain the ideal and practical characteristics of an operational amplifier.	BL2 – Understand	Analog Devices	CO1
2	Describe the internal architecture of IC 741 with a neat block diagram.	BL2 – Understand	IC 741 Datasheet	CO1
3	Explain the DC characteristics of an operational amplifier.	BL2 – Understand	Precision IC Design	CO1
4	Explain the AC characteristics of an operational amplifier.	BL2 – Understand	Signal Processing	CO1
5	Discuss the frequency response of an op-amp with suitable diagrams.	BL2 – Understand	GATE EC	CO1
6	Explain slew rate and its significance in op-amp applications.	BL3 – Apply	Industrial Signal Conditioning	CO1
7	Analyze the effect of input offset voltage and bias currents in op-amps.	BL4 – Analyze	Instrumentation Systems	CO1
8	Compare ideal and practical operational amplifiers.	BL4 – Analyze	Analog IC Design	CO1
9	Explain the differential amplifier stage used in IC 741.	BL2 – Understand	IC Manufacturing	CO1
10	Discuss the limitations of IC 741 and suggest modern alternatives.	BL4 – Analyze	Modern Op-Amps	CO1
11	Derive the expression for gain-bandwidth product of an op-amp.	BL3 – Apply	GATE EC	CO1
12	Explain CMRR and PSRR with their significance in real-time applications.	BL2 – Understand	Industrial Electronics	CO1
13	Describe various noise sources in operational amplifiers.	BL2 – Understand	Medical Electronics	CO1
14	Explain the effect of temperature variations on op-amp parameters.	BL2 – Understand	Industrial Environment	CO1
15	Illustrate the internal stages of an operational amplifier.	BL2 – Understand	Analog IC Design	CO1
16	Derive the closed-loop gain of an operational amplifier.	BL3 – Apply	GATE EC	CO1
17	An op-amp has a slew rate of 0.5 V/μs. Find the maximum frequency for a 10 V peak sine wave.	BL3 – Apply	GATE EC	CO1
18	Explain why CMRR should be very high in differential amplifiers.	BL2 – Understand	GATE EC	CO1
19	Calculate the output voltage due to input offset voltage in an op-amp.	BL3 – Apply	GATE EC	CO1
20	Explain the gain-bandwidth trade-off in operational amplifiers.	BL2 – Understand	GATE EC	CO1
21	Derive the closed-loop gain of an operational amplifier.	BL3 – Apply	GATE EC	CO1
22	An op-amp has a slew rate of 0.5 V/μs. Find the maximum frequency for a 10 V peak sine wave.	BL3 – Apply	GATE EC	CO1
23	Explain why CMRR should be very high in differential amplifiers.	BL2 – Understand	GATE EC	CO1