

Analog Electronics (313324)

Most repeated questions — MSBTE K-scheme papers S-2026, W-2025, S-2025, W-2024

How to read: **Asked in** shows the MSBTE papers where the same question came (same idea, any wording).

High = came in 3 or 4 of the 4 papers, **Medium** = 2 papers, **Low** = 1 paper. Prepare High ones first. Topics are grouped area-wise.

Paper pattern (all 4 papers): 3 hours, 70 marks. Q.1 any 5 of 7 (2 M each), Q.2–Q.4 any 3 (4 M each), Q.5–Q.6 any 2 of 3 (6 M each).

Top questions (came in all 4 papers)

1. Compare class A, B, AB and C power amplifiers (conduction angle, Q-point, efficiency, waveform / dissipation / application) (4 marks)
2. Define oscillator / classify; Barkhausen criteria for sustained oscillations (2/4 marks)
3. RC phase shift oscillator using op-amp — explain / design for given frequency (4 marks)
4. IC 555 astable multivibrator — explain / numerical / design (f, duty cycle) (4/6 marks)

Power amplifiers

Question / topic	Marks	Asked in	Probability
Compare class A, B, AB and C power amplifiers (conduction angle, Q-point, efficiency, waveform / dissipation / application)	4	S-26, W-25, S-25, W-24 (4/4)	High
Class A power amplifier (single stage / direct coupled) — circuit, working, waveforms	4	S-26, W-25, W-24 (3/4)	High
Class B push-pull amplifier with waveforms; crossover distortion and its remedy	4/6	S-26, W-25, W-24 (3/4)	High
List / classify types of power amplifiers	2	W-25, S-25 (2/4)	Medium
Define gain, bandwidth, distortion of (power) amplifier	2	S-26, W-24 (2/4)	Medium
Class AB push-pull amplifier	6	W-25 (1/4)	Low
Class A push-pull amplifier	6	S-25 (1/4)	Low
Class C power amplifier	4	S-25 (1/4)	Low
Heat sink in power amplifier	2	W-25 (1/4)	Low
Class A numerical — total power drawn for given output power and efficiency	4	W-24 (1/4)	Low

Feedback amplifiers and oscillators

Question / topic	Marks	Asked in	Probability
Define oscillator / classify; Barkhausen criteria for sustained oscillations	2/4	S-26, W-25, S-25, W-24 (4/4)	High
RC phase shift oscillator using op-amp — explain / design for given frequency	4	S-26, W-25, S-25, W-24 (4/4)	High
Negative feedback — advantages / disadvantages / effect on gain, R_i , R_o , bandwidth, GBW	2/4/6	S-26, W-25, W-24 (3/4)	High
Compare amplifier and oscillator	2	S-25, W-24 (2/4)	Medium
Hartley oscillator using op-amp — working and frequency derivation	6	W-25, W-24 (2/4)	Medium
Crystal oscillator (BJT based) — working principle	4/6	S-26, S-25 (2/4)	Medium
Wien bridge oscillator using op-amp	6	S-25 (1/4)	Low
Types of feedback connections (draw any one)	4	W-25 (1/4)	Low
Compare positive and negative feedback	4	S-25 (1/4)	Low

Operational amplifier and its applications

Question / topic	Marks	Asked in	Probability
Block diagram of op-amp with function of each block / function of level shifting stage	2/4	S-26, W-25, W-24 (3/4)	High
Op-amp parameters — define (CMRR, slew rate, bias / offset current) with ideal and practical values	2/4	S-26, S-25, W-24 (3/4)	High
Integrator / differentiator — circuit, output expression, waveforms, comparison	4	S-26, W-25, S-25 (3/4)	High
Pin diagram of IC 741	2	W-25, W-24 (2/4)	Medium
Inverting / non-inverting amplifier numerical with waveforms	4/6	S-25, W-24 (2/4)	Medium
Differential amplifier / subtractor using op-amp	2/4	W-25, S-25 (2/4)	Medium
Zero crossing detector (inverting / non-inverting) with waveforms	4/6	W-25, W-24 (2/4)	Medium
Schmitt trigger numerical — VUT, VLT, hysteresis	4/6	S-25, W-24 (2/4)	Medium
Sample and hold circuit with waveforms	6	S-26, S-25 (2/4)	Medium
V-to-I converter (grounded load) / applications of I-to-V converter	2/4	S-26 (1/4)	Low
Ideal and practical transfer characteristics of op-amp	2	S-26 (1/4)	Low
Virtual ground concept	4	W-24 (1/4)	Low

Active filters

Question / topic	Marks	Asked in	Probability
Active vs passive filters (compare / merits)	2/4	W-25, S-25, W-24 (3/4)	High
Define filter terms (roll-off rate, pass band, centre frequency, order)	2	S-26, W-25, W-24 (3/4)	High
Second order high pass filter — design / explain with response	6	W-25, W-24 (2/4)	Medium
Ideal and practical frequency response of LPF and HPF	4	W-25, W-24 (2/4)	Medium
First order low pass filter — circuit, expressions, numerical / design	4/6	S-26, W-25 (2/4)	Medium
Second order low pass filter — design	6	S-25, W-24 (2/4)	Medium
First order high pass filter — circuit, expressions / design (gain 2)	6	S-26 (1/4)	Low
Band pass filter — circuit and characteristics / filter for given response	4	S-25 (1/4)	Low

Timer IC 555 and PLL

Question / topic	Marks	Asked in	Probability
IC 555 astable multivibrator — explain / numerical / design (f, duty cycle)	4/6	S-26, W-25, S-25, W-24 (4/4)	High
IC 555 pin diagram / pin functions; function of IC 555 and IC 565	2	S-26, W-25, W-24 (3/4)	High
Applications of PLL — FM demodulator / frequency multiplier	4/6	S-26, W-25, W-24 (3/4)	High
IC 555 monostable multivibrator	6	S-26, S-25 (2/4)	Medium
Block diagram of PLL with function of each block	4	S-25, W-24 (2/4)	Medium
IC 555 as VCO	4	W-25 (1/4)	Low
PLL lock range and capture range	2	S-25 (1/4)	Low

Note: Based on MSBTE papers S-2024...S-2026 available on msbte.ac.in (K-scheme papers W-2024, S-2025, W-2025, S-2026). Practice guidance only — not a prediction of the exam, and not an official MSBTE document. Study the full syllabus. Prepared by Ananda Technologies — free for students — anandatechnologies.in