Circuits and Networks (313325)

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. Numericals come with different values every time — practise the method.

Top questions (came in all 4 papers)

1. Source conversion — steps / example / numerical (voltage ↔ current source) *(4/6 marks)*
2. Mesh analysis numerical (find branch current) *(4 marks)*
3. Nodal analysis — steps / numerical (node voltage, current or power) *(4/6 marks)*
4. Superposition theorem — numerical (current through a resistor) *(4/6 marks)*
5. Thevenin's theorem — numerical (equivalent circuit / load current) *(4/6 marks)*
6. Norton's theorem — statement / numerical (equivalent circuit, load current) *(2/4/6 marks)*
7. Maximum power transfer — statement / find RL and Pmax *(2/4/6 marks)*
8. Series R-L-C (coil + capacitor) numerical: XL, XC, Z, I, pf, voltages, power *(4/6 marks)*
9. Z-parameters — equations / explain / find for given network *(2/4 marks)*
10. Filters — LPF/HPF: define, compare, frequency response, fc, pass/stop band, applications *(2/4/6 marks)*

Unit I — Network fundamentals and network reduction (terms, sources, source conversion, star-delta, mesh, nodal)

Question / topic	Marks	Asked in	Probability
Source conversion — steps / example / numerical (voltage ↔ current source)	4/6	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Mesh analysis numerical (find branch current)	4	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Nodal analysis — steps / numerical (node voltage, current or power)	4/6	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Define network terms: node, branch, loop, mesh	2	S-26, W-25, W-24 **(3/4)**	**High**
Equivalent resistance between A and B (series-parallel / bridge network)	4	S-26, W-25, W-24 **(3/4)**	**High**
State / define KCL and KVL	2	W-25, S-25 **(2/4)**	**Medium**
Ideal and practical voltage / current source (draw / explain)	2/6	W-25, S-25 **(2/4)**	**Medium**
Active / passive network (types of network)	2	S-26 **(1/4)**	**Low**

Star-delta transformation — diagrams and conversion equations	4	S-25 **(1/4)**	**Low**

Unit II — Network theorems

Question / topic	Marks	Asked in	Probability
Superposition theorem — numerical (current through a resistor)	4/6	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Thevenin's theorem — numerical (equivalent circuit / load current)	4/6	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Norton's theorem — statement / numerical (equivalent circuit, load current)	2/4/6	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Maximum power transfer — statement / find RL and Pmax	2/4/6	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Superposition theorem — statement / steps / drawbacks	4	S-26, S-25, W-24 **(3/4)**	**High**
Thevenin's theorem — statement and stepwise procedure	4/6	S-26, W-25, S-25 **(3/4)**	**High**
Reciprocity theorem — statement / verification	2/4	W-25, S-25, W-24 **(3/4)**	**High**

Unit III — Single-phase AC circuits

Question / topic	Marks	Asked in	Probability
Series R-L-C (coil + capacitor) numerical: XL, XC, Z, I, pf, voltages, power	4/6	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Define active, reactive and apparent power (formula, units)	2	S-26, W-25, S-25 **(3/4)**	**High**
Series R-C numerical (Z, I, pf, power / find R and C)	4/6	S-26, W-25, S-25 **(3/4)**	**High**
Series R-C circuit — circuit, equations, phasor, impedance / power triangle	2/4	S-26, W-25, W-24 **(3/4)**	**High**
R-L / pure L circuit — phasor diagram, waveforms, voltage triangle	2/6	S-26, S-25, W-24 **(3/4)**	**High**
Coil (R-L) numerical: Z, XL, I, pf, power	4	S-25, W-24 **(2/4)**	**Medium**
Series R-L-C phasor diagram, impedance and power triangles (XL < XC etc.)	4	W-25, S-25 **(2/4)**	**Medium**
Units of impedance / reactance	2	S-26 **(1/4)**	**Low**

Unit IV — Resonance

Question / topic	Marks	Asked in	Probability
Resonance — define / condition for series or parallel resonance / formula of fr	2	S-26, S-25, W-24 **(3/4)**	**High**
Compare series and parallel resonant circuits	4/6	W-25, S-25, W-24 **(3/4)**	**High**
Derive resonant frequency of series RLC circuit	4	S-26, S-25 **(2/4)**	**Medium**
Resonance curve / variation of impedance, current, pf with frequency	2/4/6	S-26, W-24 **(2/4)**	**Medium**
Series resonance numerical (fr, I, pf, Q)	4	W-25, W-24 **(2/4)**	**Medium**
Parallel resonance numerical (C for resonance, Q, dynamic impedance, branch currents)	6	S-25, W-24 **(2/4)**	**Medium**
Parallel resonance: derive fr, dynamic impedance, phasor; rejector circuit	2/6	W-25 **(1/4)**	**Low**
Characteristics of series resonant circuit	2	W-25 **(1/4)**	**Low**
Quality factor and bandwidth — define, expressions	6	S-26 **(1/4)**	**Low**

Unit V — Two-port networks, filters and attenuators

Question / topic	Marks	Asked in	Probability
Z-parameters — equations / explain / find for given network	2/4	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Filters — LPF/HPF: define, compare, frequency response, fc, pass/stop band, applications	2/4/6	S-26, W-25, S-25, W-24 **(4/4)**	**High**
Y-parameters — equations / equivalent circuit / find for network / symmetry, reciprocity	4	S-26, W-25, W-24 **(3/4)**	**High**
ABCD parameters — equations / find for network, reciprocity and symmetry	2/6	S-25, W-24 **(2/4)**	**Medium**
Two-port network — define / interconnections (cascade, series, parallel)	2/6	W-25, S-25 **(2/4)**	**Medium**
Attenuators — T vs π comparison / π attenuator features and applications	4	S-26, W-24 **(2/4)**	**Medium**

Unit grouping follows the topics of the K-scheme syllabus as used in these papers; check your syllabus copy for exact unit titles.

Note: Based on MSBTE papers S-2024…S-2026 available on msbte.ac.in (K-scheme papers found for this subject: 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