

BEE Paper-3 — Exam Weightage & Star Rating (marks-based, 4 papers)

BEE Paper-1 · Complete Chapter Notes (v2) · 2014 Guidebook

BEE Paper-3 — Cross-Chapter Weightage Blueprint

Energy Efficiency in Electrical Utilities · marks-based analysis of 4 papers (2025, 2024, 2023, 2022)

Paper structure (every year): Section I Objective $50 \times 1 = 50$ · Section II Short $8 \times 5 = 40$ · Section III

Long $6 \times 10 = 60$ · Total 150 · 3 hrs · Pass = 75.

⚠️ **100 of 150 marks are descriptive (short + long) — mostly NUMERICALS.** So rank chapters by *marks*, not by how many 1-mark objectives they have.



THE KEY INSIGHT (why this differs from a naive question-count)

Some chapters (**Electric Motors, Lighting**) throw many easy **1-mark objectives** but win **few descriptive marks**. Others (**Electrical, Compressed Air, Pumps, HVAC**) have fewer questions but own the **big 5- and 10-mark numericals**. Ranked by *actual marks*, the priority order is very different — and this is the order that wins the exam.



CHAPTER RATING — by exam MARKS (avg across 4 papers)

Ch	Chapter	Avg marks /150	≈ %	Rating	What the examiner asks
1	Electrical Systems	~23	~15%	★★★★★	Transformer losses & efficiency at %-load (numeric long), PF/kVAR/capacitor, maximum demand & tariff, T&D/AT&C losses, harmonics.
4	HVAC & Refrigeration	~23	~15%	★★★★★	COP / TR / kW-per-TR numericals, vapour-compression vs absorption, refrigerants, psychrometry, ventilation/ACH.
3	Compressed Air	~20	~13%	★★★★★	FAD / leakage % / specific power numericals, intercooling, pressure settings, receiver sizing.
6	Pumps & Pumping	~18	~12%	★★★★☆	Pump power ($\rho g Q H$) & efficiency, affinity laws ($P \propto N^3$), throttling vs VFD, NPSH/cavitation.
10	Buildings & ECBC	~15	~10%	★★★★☆	ECBC applicability (≥ 100 kW / 120 kVA) , U-value/SHGC/WWR, EPI ($\text{kWh/m}^2/\text{yr}$) , GRIHA/LEED.
7	Cooling Towers	~13	~9%	★★★☆☆	Range / Approach / Effectiveness , evaporation loss, COC & blowdown (recurring numeric).
5	Fans & Blowers	~11	~7%	★★★☆☆	Fan laws ($\text{flow} \propto N$, $\text{pressure} \propto N^2$, $\text{power} \propto N^3$) , fan power/efficiency, damper vs VFD.
9	DG Sets	~11	~7%	★★★☆☆	SFC (units/litre) & DG efficiency , loss split (flue-gas biggest), waste-heat recovery, loading.
2	Electric Motors	~10	~7%	★★★☆☆	Many easy objectives (losses, IE-class, slip) + replacement savings [$\text{kW}(1/\eta_{\text{old}} - 1/\eta_{\text{new}})$], VFD, loading.
8	Lighting System	~7	~5%	★★☆☆☆	Mostly easy objectives — efficacy (lm/W), lux/lumen, lamp/LED types, ILER , illuminance.

Ratings reflect total MARKS (objective + short + long) per chapter, averaged over 2025/2024/2023/2022.

Motors & Lighting: bank their easy 1-mark objectives fast, but don't over-invest — the descriptive marks live in Ch 1, 4, 3, 6.



STUDY ORDER (by marks / yield)

Lock hardest first (★★★★★): Ch 1 → Ch 4 → Ch 3

Then (★★★★☆): Ch 6 → Ch 10

Then (★★★☆☆): Ch 7 → Ch 5 → Ch 9 → Ch 2

Last, quick objective-bank (★★☆☆☆): Ch 8

Every top chapter has a signature numerical — **drill the formula until automatic:** transformer loss at %-load (Ch1), COP/kW-TR (Ch4), FAD/leakage (Ch3), pump power + affinity (Ch6), then cooling-tower range/approach/blowdown (Ch7).



TIME BUDGET (3 hours)

- Section I (50 objectives): ~45 min (~50 sec each; skip & return if stuck).
- Section II (8 shorts): ~50 min (~6 min each).
- Section III (6 longs): ~75 min (~12 min each). Buffer ~10 min.
- **Bank easy objective + formula marks first; never let one numerical eat 20 min.**

Each chapter's v2 notes carry this marks-based rating on the cover.