Transformer calculations and energy balance

Teacher / technician

YEAR 11 / LESSON 88 / PHYSICS ONLY

Staff preparation and answer guidance. Keep separate from student sheets. Record actual measurements separately from labelled practice examples.

Coverage and delivery

Physics only: 6.19P–6.20P. Voltage/turns ratio and ideal power balance.

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, working in 15 pairs

Item	Per pair / setup	Class total
Booklets and calculators	1 each per learner	30 of each

Immediate safety

Paper calculations only. No transformer, mains circuit or high-voltage apparatus is operated.

Preparation and delivery

Read alongside the student method

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1. Keep the two ideal cases and the separately labelled real-efficiency case distinct.

2. Require units and correct primary/secondary labels in substitutions.

Close of lesson

• Retain calculations and return calculators.

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

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- 3.0 V.
- 6.0 W.
- 0.50 A.
- 18 V and 0.20 A.
- 80% and 4 W.
- Ideal input and output powers are equal, so current falls as voltage rises.

References and provenance

Pearson Physics specification

IOP: electromagnetism

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.