

6.1 Generators transformers and the home (P)

Name: _____ Class: _____ Date: _____

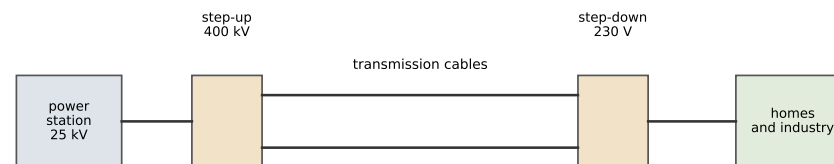
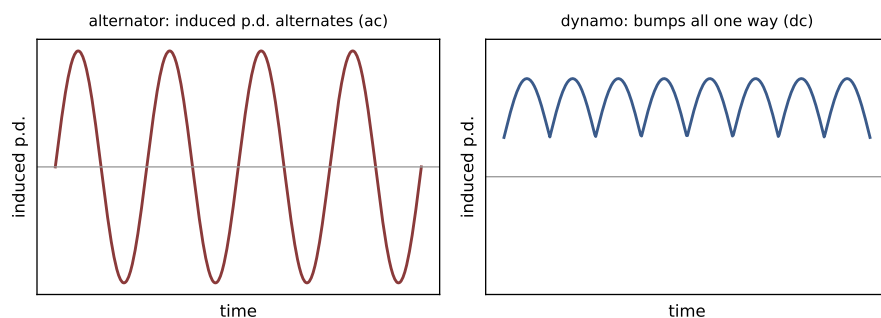
Total: 20 marks

Objective

Cover generating, transmitting and transforming electricity (3.6.1–3.6.3): the generator effect and its factors, alternator and dynamo traces, the grid with step-up/step-down transformers, the turns-ratio and power equations, switch-mode transformers, and home a.c./d.c. with fuses and earthing. All (P) Paper-2 content. Original OxfordAQA practice.

1 Key knowledge and worked examples

■ Induce, transform, protect



high voltage keeps the current small, so cable heating (I^2R) losses stay low

$$\frac{V_p}{V_s} = \frac{n_p}{n_s} \quad V_p I_p = V_s I_s$$

Worked check. 500 primary turns, 50 secondary, 230 V in: $V_s = 230 \times 50/500 = 23$ V (step-down); if the secondary supplies 2 A, the primary draws $I = 23 \times 2/230 = 0.2$ A.

2 Practice

2.1 State the two situations that induce a p.d. [2]

2.2 Name three factors increasing an induced p.d. [3]

2.3 Why is electricity transmitted at high voltage? [2]

2.4 A transformer: 1000 primary turns, 250 secondary; 12 V in. Calculate the output.[2]

2.5 State one advantage of a circuit breaker over a fuse. [1]

3 Exam-style questions

3.1 Explain, step by step, how a transformer transforms voltage, naming each coil. [3]

3.2 A power station exports 200 MW at 400 kV. Calculate the line current, and the current had it been sent at 25 kV, and comment on losses. [4]

3.3 Describe how earthing plus a fuse protects someone touching a faulty metal-cased heater. [3]
