1 **(a)** **(i)** (magnetic) field (lines) of magnet cut by turns / coil / wire
OR (magnetic) field linked with coil changes — B1

(ii) **1** (needle of meter) deflects to the left (and returns to zero) — B1

2 (needle of meter) deflects to right and left (alternately)
OR to and fro — B1

(b) **(i)** $N_p/N_s = V_p/V_s$ in any form OR $(N_s =)\ N_pV_s/V_p$ OR $8000 \times 6/240$ — C1
OR $(V_p/V_s =)$ 40
$(N_S =)$ 200 — A1

(ii) **1** $(P = IV = 0.050 \times 240 =)$ 12 W — B1

2 0.9×12 OR 10.8 OR $I_sV_s = 0.9\ I_pV_p$ OR $I_s = 0.9\ I_pV_p\ /V_s$ — C1
OR $0.9 \times 0.05 \times 240/6$
$(I_s =)$ 1.8 A ecf **1.** — A1

[Total: 8]

2 **(a** **(i)** electromagnetic induction OR mutual induction — B1

(ii) copper — B1

good conductivity OR good conductor — B1

(b) **(i)** $N_P \div N_s = V_P \div V_s$ in any form OR $N_P\ V_s \div V_P$
accept in ratio format — C1

400 — A1

(ii) (current in secondary =) 4×1.5 OR 6.0 (A)

$I_PV_P = I_SV_S$ in any form OR $I_SV_S \div V_P$ — C1

0.30 OR 0.3 A — A1

3 **(a)** (magnetic) field (lines) of magnet cuts coils (of solenoid)
OR (magnetic) field in solenoid changes — B1

(b) meter deflects in opposite direction — B1

deflection is greater (than initially) OR for shorter time — B1

magnet moving faster — B1

more field lines cut per second OR
opposite pole **and** direction **and** end of solenoid — B1

(c) any two from: — max. B2

- stronger magnet
- use a solenoid (of same length) with more turns
- use a more sensitive meter
- use wires of smaller resistance for solenoid or connecting wires
- drop from further up

[Total: 7]

4 **(a** (step-down) transformer — B1

(b) (alternating current causes) magnetic field in core / iron
magnetic field changes / alternates
field cuts / links with secondary coil OR secondary coil cuts field — B1
e.m.f. / voltage **induced** (and current flows in lamp)
OR **induced** current (in lamp) — B1

(c) $V_1 / V_2 = N_1 / N_2$ in any form OR $(N_1 =)\ N_2 \times V_1 / V_2$ OR $450 \times 240 / 12$
$= 9000$ — A1

(ii) tick 4th box — B1

[Total: 8]

5	**(a)** ≥ 3 horizontal lines in gap by eye	B1
	≥ 4 evenly spaced horizontal lines filling ¾ of width of gap AND arrows L to R	B1
	(b) (i) ammeter deflects / gives a reading OR registers a current	B1
	wire <u>cuts</u> the field lines o.w.t.t.e.	M1
	e.m.f. / voltage / current <u>induced</u> / <u>produced</u> / <u>generated</u>	A1
	(ii) 1 reading / deflection / current increased	B1
	2 reading / deflection / current reversed ignore magnitude	B1
		[Total: 7]

6	**(a)** less power / energy lost OR heat generated (in cables)	B1
	smaller current	B1
	$P = VI$ OR $P = I^2R$	B1
	(b) (i) (laminated) iron core	B1
	(ii) (connected to) primary (coil)	B1
	(iii) (N_S =) $N_P V_S / V_P$ OR 400 × 115 000 / 5 000	
	9 200 (turns)	A1
	(c) less insulation needed OR safer OR devices designed for 230 V	B1
		[Total: 8]