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 $(N_s =) N_p V_s/V_p$ 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 $I_s V_s = 0.9\, I_p V_p$ OR $I_s = 0.9\, I_p V_p /V_s$ 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 $6.0\,(A)$

      $I_P V_P = I_S V_S$ in any form OR $I_S V_S \div V_P$ 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 $400 \times 115\,000 / 5\,000$
              9 200 (turns)   A1

   (c) less insulation needed OR safer OR devices designed for 230 V   B1

                                                        [Total: 8]