M1. (a) (i) secondary(coil) / output (coil)
*do **not** accept just coil*

1

(ii) <u>core</u>
*do **not** accept for either mark it is made out of iron ore*

1

(laminated soft) <u>iron</u>
*allow **1** mark for 'it is made out of iron core'*

1

(iii) magnetic field
accept magnetism / magnetic force

1

(which is) changing / alternating
direction (of field) changes / strength (of field) varies
scoring second mark is dependent on first mark

1

(b) ...step-up .... step-down ...
both in the correct order

1

(c) Do not build new houses ....

1

Build new power lines away ....
*deduct **1** mark for any other(s) to a minimum total of (0)*

1

[8]

M2.   (a)   (it is) magnetic

or will carry (an alternating) magnetic field

or magnetises and demagnetises (easily)

reference to conduction negates the mark

1

(b)   so the current / electricity does not flow through the iron / core

accept 'so the current / electricity / wires do not short (circuit)'

responses in terms of heat insulation negate the mark

ignore references to safety

1

(c)   5.75 or 5.8 or 6(.0)

*allow for **1** mark **either***

$$\frac{230}{p.d.} = \frac{20\,000}{500}$$

or

p.d. = 230 ÷ 40

2

V / volt(s)

1

[5]

M3. (i) iron

for 1 mark

1

(ii) 20

gains 2 marks

else working

gains 1 mark

2

(iii) reverse input/output

for 1 mark

or increase secondary turns

1

[4]

M4. (a) (i) (quickly) becomes magnetized

or (quickly) loses its magnetism

or 'it's (a) magnetic (material)'

any reference to conduction of electricity/heat nullifies the mark

1

(ii) any **four** from:

- insulation prevents electricity/current flowing through the iron/core

 or 'insulation so electricity/current only flows in the wires/turns/coils'

- <u>alternating</u> current/a.c. in the primary (coil)

- produces a <u>changing</u> magnetic field (in the iron/core)

- (and hence magnetic) field in the secondary (coil)

- induces/generates/produces an <u>alternating</u> potential difference/p.d./voltage across the secondary (coil)

- (and hence) <u>alternating</u> current/a.c. in the secondary (coil)

4

(b) 80 (turns)

or credit (1) for any equation which <u>if correctly evaluated</u> would give 80 example

example

$$\frac{230}{5.75} = \frac{3200}{number\ of\ turns}$$

2

[7]

M5.(a)   step-down

1

(b)   (i)   1.6

correct order only

1

12.8

1

(ii)   values of p.d. are smaller than 230 V

1

(c)   (i)   a.c. is constantly changing direction

accept a.c. flows in two / both directions
accept a.c. changes direction(s)
a.c. travels in different directions is insufficient

1

d.c. flows in one direction only

1

(ii)   an alternating current / p.d. in the primary creates a <u>changing / alternating magnetic</u> field

1

(magnetic field) in the (iron) <u>core</u>

current in the core negates this mark
accept voltage for p.d.

1

(and so) an <u>alternating</u> p.d.

1

(p.d.) is <u>induced</u> across secondary coil

1

[10]

M6. (a) 10

allow **1** mark for correct substitution ie $\dfrac{230}{V_s} = \dfrac{4600}{200}$

<div align="right">2</div>

(b) any **one** from:

- to prevent short circuiting

- to ensure that the <u>current</u> flows / goes round the coil

- to prevent the <u>current</u> entering the core
  *do **not** accept electrocution*
  *do **not** accept electricity for current*
  answers including heat / energy loss negate mark

<div align="right">1</div>

(c) (i) (soft) iron
  *do **not** accept 'steel'*

<div align="right">1</div>

(ii) can be magnetised

because it is magnetic
  answers including it's a conductor negate mark

<div align="right">1</div>

<div align="right">[5]</div>

M7.   (a)   aluminium cannot be magnetised

accept aluminium is not magnetic

"it" refers to aluminium

*do **not** accept aluminium is not easily magnetised*

reference to conduction and aluminium negates mark

iron can be magnetised is insufficient

     1

(b)   (i)   10 to 50

either order

     1

(ii)   (data is) anomalous

*accept does **not** fit the pattern*

it is an error is insufficient

     1

(iii)   21

accept 22

*do **not** accept any fraction of a turn ie 20.1*

     1

secondary p.d. (just) larger than primary p.d.

accept output (just) larger than input/2V

or there must be more turns on the secondary coil than primary coil

*do **not** accept coil for turns*

     1

(c)   to reduce/step-down the (input) p.d./voltage

mains p.d. is too high is insufficient

step-down transformer is insufficient

*answers in terms of changing/ stepping-up current **or** fuse blowing **or** not working with 230 volts are insufficient*

any mention of step-up negates mark

*stepping down both voltage/p.d. **and** current negates mark*

     1

     [6]

M8. (a) (i) live

1

(ii) react faster

1

(iii) live and neutral

1

(b) (i) ammeter

1

to measure current
accept to measure amps

1

plus any **one** from:

• *variable* resistor (1)
to vary current (1)
accept variable power supply
accept change or control

• *switch* (1)
to stop apparatus getting hot / protect battery
or
to reset equipment (1)

• fuse (1)
to break circuit if current is too big (1)

2

(ii) any **two** from:

• use smaller mass(es)
• move mass closer to pivot
• reduce gap between coil and rocker

- more turns (on coil)*coil / loop*
- <u>iron</u> core in coil

accept use smaller weight(s)

2

[9]