

Q1.

- (a) **A** primary coil
and
B secondary coil

1

C iron core

1

- (b) (the alternating current causes) a changing magnetic field
around the primary (coil)

1

creates magnetic field that changes direction in the core
allow creates a changing magnetic field in the core

1

this induces an alternating potential difference across the
secondary (coil (causing an alternating current)

1

[5]

Q2.

- (a) step-down

1

- (b) (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 changing /
alternating magnetic field

1

(magnetic field) in the (iron) core
current in the core negates this mark
accept voltage for p.d.

1

(and so) an alternating p.d.

1

(p.d.) is induced across secondary coil

1

[10]

Q3.

- (a) (the alternating current creates) a changing / alternating magnetic field

1

(magnetic field) in the (iron) core

accept that links with the secondary coil

current in the core negates this mark

1

(causing a) potential difference (to be) induced in / across secondary coil

accept voltage for p.d.

1

[3]

Q4.

- (a) (i) any **one** from:

*do **not** accept any response in terms of heat insulation, safety or electric shock*

- (so that there is) no short circuit
- (so that the) current goes around the coil
*do **not** accept electricity for current*
- (so that the) current does not enter the core

1

- (ii) (easily) magnetised (and demagnetised)

accept '(it's) magnetic'

*do **not** accept 'because it's a conductor'*

1

- (iii) alternating current in the primary (coil)

1

produces a changing magnetic field (in the core)

1

this induces an (alternating) potential difference across the secondary (coil)

1

[5]

Q5.

- (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'
- alternating current/a.c. in the primary (coil)
- produces a changing magnetic field (in the iron/core)
- (and hence magnetic) field in the secondary (coil)
- induces/generates/produces an alternating potential difference/p.d./voltage across the secondary (coil)
- (and hence) alternating current/a.c. in the secondary (coil)

4

[5]

Q6.

- (a) (i) (laminated soft) iron
do not accept steel

1

- (ii) produces a magnetic field
accept magnetic flux

which is alternating / changing / varying

and which induces / produces an alternating / changing potential difference across the secondary coil
accept current / voltage

3

[4]

Q7.

(a) any **three** from:

- alternating current (a.c.) in the primary (coil)
- produces a **changing** magnetic field / flux (in the core)
- which is made of (laminated soft) iron
- this induces
must be idea of inducing something in the secondary coil
- an alternating potential difference across the secondary coil
accept voltage for potential difference

3

[5]

Q8.

(a) (i) Iron
for 1 mark

1

(b) changing current in primary causes changing (magnetic) field in core links to secondary inducing voltage (emf) in secondary (**NOT** current) secondary voltage/current is alternating
for 1 mark each

4

(c) magnetic field not changing/no electromagnetic induction because direct current
for 1 mark each

2

[10]

Q9.

(a) an alternating current through the primary coil (in the charging base)
it must be clear which coil is being referred to

1

causes a changing / alternating magnetic field in / around the (iron) bar

1

which induces an (alternating) p.d. across the secondary coil (in the toothbrush)

accept induces an (alternating) current in the secondary coil

1

[3]