

MARK SCHEME

GCSE

PHYSICS

AQA - TRIPLE SCIENCE

P7 - TEST 6
MAGNETISM
Advanced

Mark schemes

- 1.** (a) (i) Iron
for 1 mark 1
- (ii) $V/240 = 2000/10\ 000$
 $V = 48$
 V
for 1 mark each 3
- (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]

- 2.** (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
- (b) 3067 (V)
allow all 3 marks for 3060 to 3070 (V)
- $V = \frac{230 \times 4000}{300}$ *gains 2 marks*
- $\frac{230}{V} = \frac{300}{4000}$ *gains 1 mark* 3

- 3.** (a) gravity 1
- [7]

- (b) as the wire moves through the Earth's magnetic field 1
- a potential difference is induced between the ends of the wire 1
- the wire must be part of a complete circuit 1
- (c) new trace shows:
- twice the frequency 1
- twice the amplitude 1
- (d) dynamo 1
- dc generator is insufficient*
- (e) the alternator pd changes polarity, the 2nd type of generator does not 1
- (f) $\frac{230}{V_s} = \frac{690}{57}$ 1
- $V_s = \frac{230 \times 57}{690}$ 1
- $V_s = 19 \text{ (V)}$ 1
- an answer of 19 (V) scores 3 marks* 1
- [11]**

- 4.** (a) motor (effect) 1
- (b) (i) wire kicks further (forward) 1
- accept moves for kicks*
- accept moves more*
- accept 'force (on the wire) increased'*
- (ii) wire kicks back(wards) / into (the space in) the (horseshoe) magnet 1
- accept moves for kicks*
- accept 'direction of force reversed'*

[3]

5.

- (a) (i) step-down (transformer) because fewer turns on the output/secondary (coil)

no credit for just 'step-down transformer'

accept '...less turns...'

do not credit '...fewer coils...'

or 'the p.d. across the input / primary will be greater than the p.d. across the output / secondary'

1

- (ii) to prevent a short (circuit)(through the turns of wire or through the core

do not credit references to safety or heat (insulation)

1

- (iii) (easily) magnetised (and demagnetised)

accept '(it's) magnetic'

do not accept 'because it's a conductor'

1

- (b) 2250

correct substitution

$$\text{eg } \frac{150}{p.d. \text{ across secondary}} = \frac{500}{7500} \text{ gains 1 mark}$$

or appropriate transformation

$$\text{eg } (p.d. \text{ across secondary} =) \frac{\text{number of turns on secondary}}{\text{number of turns on primary}}$$

x p.d. across primary gains 1 mark

2

- (c) any **two** from:

- to reduce the voltage / p.d. (of the domestic supply)

or to reduce to 230 V

allow 'to reduce to 240 V'

do not credit 'reduce current to 230V'

- higher voltage difficult to insulate
- higher voltage (would) result in (fatal) electric shock

not just 'less dangerous'

- domestic appliances are not designed for (very) high voltage (input) / (are designed) for 230V

do not credit 'to increase efficiency' / 'to save energy' do not credit just 'it's safer'

2

(d) any **two** (1) each

- if the (local) power station breaks down / fails / demand / load exceeds supply

1

or words to that effect

- electricity / power can be switched from elsewhere in the system / from other power station(s)
or words to that effect
- electricity can be generated in places remote from customers
or words to that effect
- (in total) fewer power stations are needed
- power available in rural / remote areas
- National Grid allows for (better) control of supply and demand
do not credit just cheaper / more efficient / safer

1

[9]

6.

(a) north (pole)

accept N

north (pole)

both needed for mark

1

(b) reverses

accept changes direction

1

(c) (i) first finger:
(direction of) (magnetic) field

1

second finger:
(direction of) (conventional) current

1

(ii) into (plane of the) paper

1

(iii) less current in wire

accept less current / voltage / more resistance / thinner wire

1

weaker field

allow weaker magnets / magnets further apart

do not accept smaller magnets

1

rotation of magnets (so) field is no longer perpendicular to wire

1

(d) (i) reverse one of the magnets

*do **not** accept there are no numbers on the scale*

1

(ii) systematic or zero error

accept all current values will be too big

accept it does not return to zero

accept it does not start at zero

1

[10]

7.

(a) 10 500

allow 1 mark for $75 \times 32\ 200 \div 230$

2

(b) 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]