

QUESTIONSHEET 1

One mark for each of:

when the pressure switch (A) is pushed, a current flows
 the electromagnet (B) is activated/switched on
 the armature (C) is attracted to the electromagnet
 the clapper (D) hits the bell
 the circuit is broken and the armature falls back
 this remakes the circuit between spring and adjusting screw (E)
 the armature is attracted again and the bell continues to ring
 (as long as A is on)

TOTAL / 7**QUESTIONSHEET 2**

- | | |
|---|--------|
| (a) (i) (soft) iron | 1 |
| (ii) can be easily magnetised
and demagnetised | 1
1 |
| (b) least force = 1600×10 | 1 |
| = 16000 N | 1 |

TOTAL / 5**QUESTIONSHEET 3**

One mark for each of:

a coil of wire
 is fixed (on an axle) between two (flat) magnets
 which have their opposite poles facing each other
 the ends of the wire are connected via a split ring/commutator
 to a battery/power supply

5

coil drawn between magnets
 opposite poles facing

2

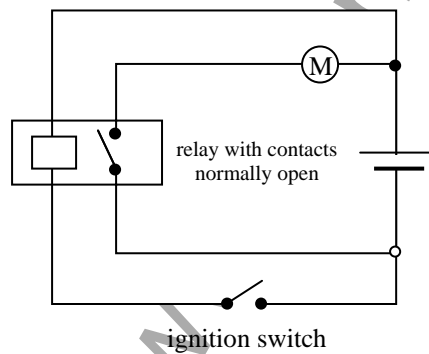
TOTAL / 7

QUESTIONSHEET 4

- | | |
|----------------------------------|---|
| (a) as split ring rotates | 1 |
| each half makes contact | 1 |
| with opposite brush | 1 |
|
(b) (i) spin/rotate the coil | 1 |
|
(ii) use slip rings | 1 |
| to replace split ring commutator | 1 |
| TOTAL / 6 | |
-

QUESTIONSHEET 5

- | | |
|---------------------------------------|---|
| (a) electromagnet is activated | 1 |
| allows current | 1 |
| to flow from battery to starter motor | 1 |
|
(b) carries a very high current | 1 |
|
(c) diagram showing | 1 |
| switch connected to relay via battery | 1 |
| motor connected to relay via battery | 1 |
| all symbols correct | 1 |



TOTAL / 7

QUESTIONSHEET 6

(a) One mark for each of the following vanes/blades rotate magnet caused to rotate voltage/current induced in the coil	4
(b)(i) larger reading	1
(ii) meter needle deflects in opposite direction	1
TOTAL / 6	

QUESTIONSHEET 7

(a) Induced voltage obtained only if change in magnetic field	1 1
(b) cuts through more magnetic field	2
(c) 1 number of turns on coil larger	1
2 area of coil larger	1
You would get a larger reading if the frequency of the ac is larger, but that is not something the person using the device can alter.	
TOTAL / 6	

QUESTIONSHEET 8

(a) $P = IV$	1
so $I = P/V$	1
$= 15000 / 275000$	1
$= 0.55 \text{ A}$	1
(b)(i) total resistance $= 200 \times 0.01$	1
$= 2 \Omega$	1
(ii) power loss $= I^2R$	1
$= 0.55^2 \times 2$	1
$= 0.61 \text{ W}$	1
TOTAL / 8	

QUESTIONSHEET 9

- (a) the wire moves 1
down 1

Use Fleming's left-hand rule to find the direction of the movement: the first finger is the field direction, the second is the current and the thumb gives the direction of motion. Remember all of your fingers have to be at right angles to each other.

- (b)(i) the wire moves 1
in the opposite direction 1
- (ii) the wire vibrates 1

TOTAL / 5

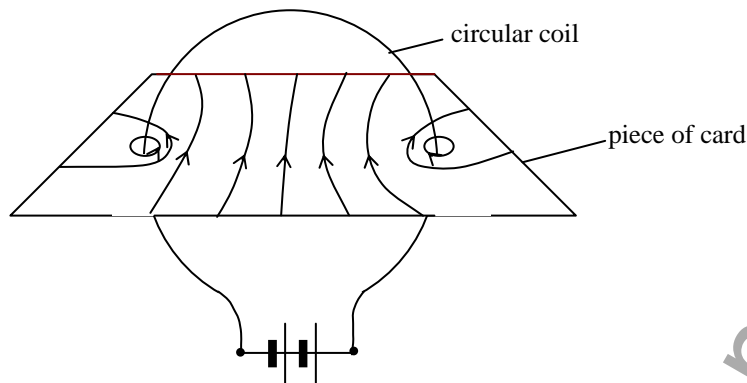
QUESTIONSHEET 10

- (a) connect to a battery/power supply 1
- (b)(i) hold paper clips near to electromagnet 1
the greater number of clips picked up, the stronger it is 1
- (ii) increase number of turns on the coil 1
increase current through coil 1

TOTAL / 5

QUESTIONSHEET 11

(a)



pattern as shown

1

more than one set of lines drawn

1

(b)(i) the left-hand end of the coil acts like a South Pole

1

(ii) arrow points towards South Pole

1

If you were to look at the left-hand end of the coil, the direction of the current is clockwise; a clockwise current means a South Pole.

TOTAL / 4

QUESTIONSHEET 12

(a)(i) left side down/right side up

2

(ii) Anticlockwise

1

(b)(i) (Split ring) commutator

1

(ii) reverses current in coil
every half turn

1

1

The current must be reversed to maintain the forces on the coil in the same direction. Note that this is not the same thing as the slip rings used in an ac generator.

TOTAL / 6

QUESTIONSHEET 13

(a) needle deflects/current registered	1
(b)(i) needle deflects in opposite direction	1
(ii) no deflection	1
There must be relative movement for a current to be induced	
(c)(i) electromagnetic induction/induced current	1
(ii) 1 number of turns on coil	1
2 speed of movement	1
3 strength of magnet	1
TOTAL / 7	

QUESTIONSHEET 14

(a) generates electricity	1
(b)only works when rotated	1
when bicycle stationary, no lights	1
(c)(i) in ac generator, coil rotates inside magnet	1
(ii) wires don't move	1
no slip rings/brushes needed	1
TOTAL / 6	

QUESTIONSHEET 15

(a)(i) step-up transformer	1
(ii) less power loss at high voltage than at high current	1
A high current means high power loss, so power is transmitted at a high voltage instead. Note that a transformer must be used which only works on ac.	
(b)(i) if kite touches cable person connected to high voltage	1
(ii) all of bird on wire/at one voltage no potential difference across bird	1
TOTAL / 9	

QUESTIONSHEET 16

(a)(soft) iron	1
(b)links magnetic fields to coil	1
(c) induced voltage only if relative movement or magnetic field changes	1
ac means magnetic field changes direction	
therefore ac in primary induces ac in secondary	3
	TOTAL / 5

QUESTIONSHEET 17

(a) 1	Compass needle deflects	1 1
2	iron filings show a pattern	1 1
(b)	circular pattern in clockwise direction	1 1

To remember the direction of the field, hold your right hand in a grip with your thumb in the current direction; your fingers give the field direction.

TOTAL / 6**QUESTIONSHEET 18**

(a)	current changes direction continually	1 1
(b)	A & D only	2

An alternating current must have part of its graph above the line (time axis) and part of it below. A direct current can be either above or below and it does not have to be a smooth graph as in C.

TOTAL / 4

QUESTIONSHEET 19

(a) (i) fuel produced over thousands of years from dead plants or animals	1
(ii) two from: coal, oil, natural gas	2
(b) One mark for each of the following: fuel is fed into boiler the boiler heats up water steam is generated the steam turns the blades of a turbine the rotating turbine turns a generator electricity is produced	6
TOTAL / 9	

QUESTIONSHEET 20

(a) eg three from washing machine, car, tape recorder, drill, vacuum cleaner	3
(b) two from: good conductor of electricity soft low cost	2
(c) use large current/ large number of turns on coil/ use several coils/ wind coils on iron core	2
TOTAL / 7	
