May 15 Paper 2B.

1a. force, direction, Joule, potential, kinetic, conservation.

b. $KE = \frac{1}{2}mv^2 = 0.15 \times \frac{1}{2} \times 1.2^2$ — m = 0.15 kg. (not 150g)

$KE = 0.108$ J.

c. see pp. A No 1 f.

d. $mom = mv = 0.15 \times 1.2 = 0.18$ kg m/s.

e. mom bef. = mom. after

car A + car B = $(0.1 + 0.15)V$

sorry, $0.18 + (0.1 \times -2) = 0.25V$

got carried away ☺ $0.18 - 0.2 = 0.25V$

$-0.02 = V$

$\frac{-0.02}{0.25}$

-0.08 m/s = V.

bef.		after
A	B	A+B
0.15 kg	0.1 kg	0.1+0.15 kg
1.2 m/s	-2 m/s	V

ei. $mom\ B = mv = 0.1 \times -2 = -0.2$ kg m/s.

ii. + momentum = $0.18 - 0.2 = -0.02$ kg m/s.

iii. mom bef. = mom. after

$-0.02 = mv$

$-0.02 = 0.25V$

$\frac{-0.02}{0.25} = V$

$V = -0.08$ m/s.

f. 2 N in the opposite direction

g. 3rd law : for every action, there is an equal + opposite reaction.

h. yes, since time of impact would increase, resulting in a smaller force since F of impact + time of impact are ½.

2ai. the wire is moved along A.

ii. the wire is moved along B.

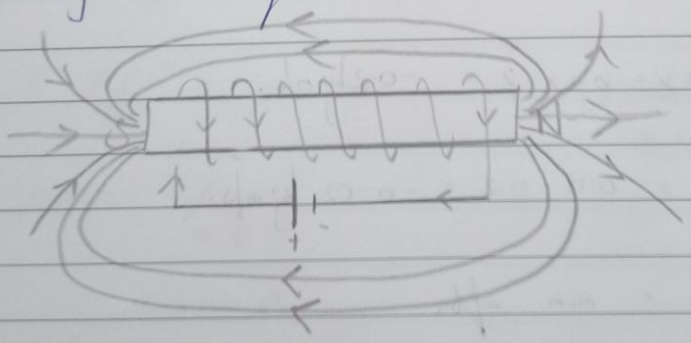
iii. the wire is moved faster

- stronger magnets are used.

b.

c. the wire will move in the direction A since a magnetic field is acting on electric field

d.



e See pp. 2A No. 2biii

f. See pp. 2A No. 2bv.

g. In computer. or relay switch.
In an electric bell. circuit breaker.

3a(i)(ii) See pp A No 3a.

b. i. nothing.
ii. yes
iii. False, True, ?

c i, ii, iii See pp A No. 3c.

d. See pp A No. d.
ii. refraction
iii. decrease.

4 a i, ii, iii See pp. 2A No. 4a.

b. $P = F/A$

$P_{required} = 672000\,Pa$

$A = 0.6\,m^2$

$672000 = F/0.6$

$F = 403200\,N.$

c i. See pp. 2A No. 4 c i

c ii. 3, 4, 1, 2. ?

d.i. $t = 0.07 \div 2 = 0.035s$

speed $= 1480$ m/s

speed $= s/t$

$1480 = s/0.035$

$s = 1480 \times 0.035$

$s = 51.8$ m.

d ii. iii. See pp. 2A No. 4d iii, iv.

iv. disadvantage : ultrasound needs a medium to travel in, so they cannot be used in a vacuum

advantage : ultrasound is sound waves not radiation. x-rays do harm to the cells in the body, so just a limited amount of x-rays can be taken.

5a $V = IR$ T. $R. = R_1 + R_2$ since series

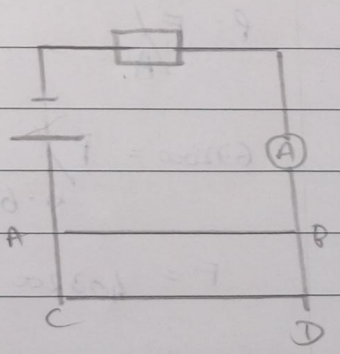
$T.R. = 2 + 4 = 6\ \Omega$

b. $V = IR$

$2 = I \times 6$

$I = 2/6 = 0.33$ A.

ci.



cii. Since parallel : $1/R_T = 1/R_1 + 1/R_2 = 1/4 + 1/4 = 2/4$

$R_1 = 4/2 = 2\ \Omega$

ciii. $T.R = 2 + 2 = 4\ \Omega$

d. i. longer wire, ↑ resistance since length of wire ∝ Resistance

ii. thicker wire, area ↑, R ↓ since area of wire ∝ 1/R.

iii. different metal: if a better conductor, R ↓, since the better the conductivity, the smaller the resistance, Resistance ∝ 1/conductivity

e i, ii, iii See pg 4 No. 5 d i, ii, iv.

e iv. 4, 5, 1, 2, 3. (2 + 3 can be changed).