1	**(a**	(nuclear) fusion	B1
	(b) (i)	charges are moving (and current is the (rate of) flow of charge)	B1
	(ii)	$Q = It$ AND t is time	B1
	(c) (i)	**1.** (they are) perpendicular OR at right angles OR at 90°	B1
		2. (they are) perpendicular OR at right angles OR at 90°	B1
	(ii)	arrow (labelled F) perpendicular to direction AND pointing towards the bottom right of the page	B1

[Total: 6]

2 **(a (i)** changing magnetic field (in coil) **or** field lines cut coil (**or** *vice versa*) B
e.m.f./current induced B1

(ii) smaller deflection/current/reading/voltage **or** deflection lasts longer (ignore slower) B1
rate of cutting field lines/change of magnetic field reduced B1

(iii) deflection/current in opposite direction B1

(b) alternating/changing current (in primary coil) B1
alternating/changing magnetic field clearly in core B1
field channelled from primary to secondary by core (somehow expressed) **or** core increases effect B1
induced e.m.f. in secondary B1 **[9]**

3 **(a)** magnetic flux changes / rod cuts magnetic field B1
emf / voltage induced ignore current induced B1 [2]

(b) Mark **(i)** & **(ii)** together
deflection increases/to R in **(i)** B1
deflection increases/to R in **(ii)** B1
correct reason in **(i)** or **(ii)** AND consistent with deflection:
in **(i)** or **(ii)** rate of change of flux (linkage) increases
in **(i)** more (magnetic) field lines cut/stronger (magnetic) field cut
in **(ii)** rod moves faster/field lines cut faster B1

(iii) no deflection AND no (magnetic) field lines cut/no change of flux (linkage) B1 [4]

4 **(a** first finger – field / magnetism / flux)
second finger – current / charge flow (NOT electron flow)) both B1

(b) brush OR contact OR sliding connector B1
split ring OR commutator NOT slip ring B1

(ii) clockwise OR right side down OR left side up OR correct arrows on figure NOT turn to the right B1

(iii) more current / more voltage / "stronger battery" / more power)
more turns on coil / more coils)
stronger magnet Ignore bigger magnets)
closer magnet / magnetic poles) any 2 B1, B1
more magnets)
iron core) [6]

5 **(a)** **(i)** circular line of force around wire through P **M1**
arrow(s) on line anticlockwise - none wrong **A1**
(ii) arrow through Q to left **A1** **3**

(b) **(i)** none/stays same **B1**
(ii) direction reverses **B1** **2**

(c) at S - stronger **B1**
at T - same (strength) **B1**
at W - same (strength) **B1** **3**
[8]