MOTOR EFFECT MARK SCHEMES

QUESTION 1

question	answers	extra information	mark
(a)	increase the current (1)	credit increase the p.d./voltage credit reduce the resistance credit have thicker wiring credit add extra / more cells	1
	increase the magnetic field (strength) (1)	credit have stronger magnet(s) do **not** credit bigger magnets **either order**	1
(b)	**either** reverse polarity **or** connect the battery the other way round		1
	either reverse direction of the magnetic field **or** put the magnet the other way round / reverse the magnet	do **not** give any credit to a response in which both are done at the same time **either order**	1

(c)	**either** conductor parallel to the magnetic field **or** lines of magnetic force and path of electricity do not cross		1
total			5
Question 2			
a)	electric drill, electric fan, electric food mixer and electric screwdriver	all four ticked and no others (2) **either** all four of these ticked and only one other (1) **or** any three of these ticked and none/one/two of the others (1)	2
b)(i)	reverse (the direction of the) current (1) reverse (the direction of the) magnetic field (1)	**or** reverse the connections (to the battery) **or** reverse the (magnetic) poles /ends do **not** credit 'swap the magnets (around)'	2
b)(ii)	any **two** from: increase the strength of the magnet(s)/ (magnetic) field increase the current reduce the gap (between coil/armature and poles/ magnets) increase the turns (on the coil/armature)	do **not** credit 'use a bigger magnet' allow 'increase the voltage/p.d.' allow add cells/batteries allow increase the (electrical) energy allow increase the power supply allow 'decrease the resistance' allow 'increase charge' allow ' increase the electricity' do **not** credit 'use a bigger battery' allow increase the (number of) coils do **not** credit 'use a bigger coil'	2

b)(i)	reverse (the direction of the) current (1) reverse (the direction of the) magnetic field (1)	**or** reverse the connections (to the battery) **or** reverse the (magnetic) poles /ends do **not** credit 'swap the magnets (around)'	2
b)(ii)	any **two** from: • increase the strength of the magnet(s)/ (magnetic) field • increase the current • reduce the gap (between coil/armature and poles/ magnets) • increase the turns (on the coil/armature)	do **not** credit 'use a bigger magnet' allow 'increase the voltage/p.d.' allow add cells/batteries allow increase the (electrical) energy allow increase the power supply allow 'decrease the resistance' allow 'increase charge' allow ' increase the electricity' do **not** credit 'use a bigger battery' allow increase the (number of) coils do **not** credit 'use a bigger coil'	2
Total			**6**
Question 3			
(a)	Q N M	all three in correct boxes one statement in correct box gains **1** mark	2
(b)	any **two** from: • increase the current / p.d. (supplied to the coil)	accept reduce the resistance of the coil **or** increase cross sectional area of wire accept more cells / batteries **or** turn up the power supply increase power is insufficient	2

	• increase number of turns (on the coil) • increase the area (of the coil) • increase the (strength of the permanent) magnetic field	accept increase the width of the coil increase width / size is insufficient accept move the magnets closer to the coil accept use stronger magnets do **not** accept use larger magnets	
(c)	an economic		1
Total			**5**
Question 4			
(a)(i)	the current (in the coil) creates a magnetic field (around the coil) so the magnetic field of the coil interacts with the (permanent) magnetic field of the magnets (producing a force)	accept the coil is an electromagnet accept the two magnetic fields interact (producing a force) if no marks scored an answer in terms of current is perpendicular to the (permanent) magnetic field is worth max **1** mark	1 1
(ii)	vertically downwards arrow on side A **and** vertically upwards arrow on side C	one arrow insufficient	1
(iii)	the current is parallel to the magnetic field	allow the current and magnetic field are in the same direction allow it / the wire is parallel to the magnetic field	1
(b)	increase the current / p.d. (of the coil)	accept decrease resistance accept voltage for p.d.	1

		accept increase strength of magnetic field / electromagnet	
(d)	yes with suitable reason **or** no with suitable reason	**eg** **yes** – it has increased our knowledge **yes** – It has led to more (rapid) developments / discoveries (in technology / materials / transport) accept specific examples **no** – the money would have been better spent elsewhere on such things as hospitals (must quote where, other things not enough) **no** mark for just **yes** / **no** reason must match **yes** / **no**	1
Total			6
Question 5			
(a)	motor		1
(b)	increase the strength of the magnetic field increase the (size of the) current	accept use a stronger magnet use a larger / bigger magnet is insufficient do **not** accept move magnets closer accept use a current greater than 2 (A) accept increase the p.d./voltage (of the power supply) increase the power supply is insufficient	1 1
(c)	any **one** from: • (reverse the) direction of the current	accept swap the wires at the power supply connections swap the wires around is insufficient	1

	• (change the) direction of the magnetic field	accept turn the magnet around do **not** accept use an a.c. supply	
(d)	The wire is parallel to the direction of the magnetic field.		1
Total			5