Name of the Student:_____
Max. Marks : 16 Marks **Time : 16 Minutes**

Mark Schemes

Q1.

(a) (i) the greater the speed (of a centrifuge), the greater the force

answers must be comparative
accept velocity for speed
accept positive correlation between speed and force
speed and force are not proportional – treat as neutral

1

the smaller the radius, the greater the force (at a given speed)

*allow **(G machine) 1** has / produces a greater force (than **G machine 2**) at the same speed*
must be comparative, eg a small radius produces a large force = 0 marks on own

1

as the speed increases the rate of change in force increases

accept force is proportional to the square of the speed
or
doubling speed, quadruples the force
accept any clearly correct conclusion

1

(ii) 12000 (N)

or

12 k(N)

1

(b) (i) the current (in the coil) creates a magnetic field (around the coil)

accept the coil is an electromagnet

1

so the magnetic field of the coil interacts with the (permanent) magnetic field of the magnets (producing a force)

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

(ii) vertically downwards arrow on side A

one arrow insufficient

and

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vertically upwards arrow on side C

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

(c) increase the current / p.d. (of the coil)

accept decrease resistance

accept voltage for p.d.

accept increase strength of magnetic field / electromagnet

1

(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

[10]

Q2.

(a) motor (effect)

1

(b) (i) wire kicks further (forward)

accept moves for kicks

accept moves more

accept 'force (on the wire) increased'

1

(ii) wire kicks back(wards) / into (the space in) the (horseshoe) magnet

accept moves for kicks

accept 'direction of force reversed'

1

[3]

Q3.

(i) away from magnet

arrow should be perpendicular to field lines and current as judged by eye

1

(ii) current in wire creates magnetic field around wire

1

two fields interact **or** combine giving a resultant force (on the wire)

1

[3]

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