

Name of the Student: \_\_\_\_\_

Max. Marks : 22 Marks

Time : 22 Minutes

Mark Schemes

**Q1.**(a) It is easily magnetised. 1(b) p.d. across the secondary coil is smaller (than p.d. across the primary coil) 1

(c) ratio  $\frac{V_p}{V_s} = \frac{6}{12}$   
*accept any other correct ratio taken from the graph* 1

$\frac{6}{12} = \frac{50}{N_p}$   
*use of the correct turns ratio and substitution or correct transformation and substitution* 1

$N_p = 100$   
*allow 100 with no working shown for 3 marks* 1

**[5]****Q2.**(a) motor effect 1

(b) increase the strength of the magnet  
**or**  
 increase the current 1

(c)  $4.8 \times 10^{-4} = F \times 8 \times 10^{-2}$  1

$F = 6 \times 10^{-3} \text{ (N)}$  1

$6 \times 10^{-3} = B \times 1.5 \times 5 \times 10^{-2}$  1

$$B = \frac{6 \times 10^{-3}}{}$$

1

$$B = 8 \times 10^{-2} \text{ or } 0.08$$

1

*allow  $8 \times 10^{-2}$  or 0.08 with no working shown for 5 marks*  
*a correct method with correct calculation using an incorrect value of  $F$  gains 3 marks*

Tesla

*accept T*

1

*do not accept t*

[8]

### Q3.

- (a) in a longitudinal wave the oscillations / vibrations are parallel to the direction of energy transfer.  
*accept wave travel for energy transfer throughout*

1

in a transverse wave the oscillations / vibrations are perpendicular to the direction of energy transfer.

1

- (b) accept any sensible suggestion eg a vibrating drum skin does not move the air away to create a vacuum (around the drum)

1

- (c) **Level 3 (5–6 marks):**

A detailed explanation linking variations in current to the pressure variations of a sound wave, with a logical sequence.

**Level 2 (3–4 marks):**

A number of relevant points made, but not precisely. A link between the loudspeaker and a sound wave is made.

**Level 1 (1–2 marks):**

Some relevant points but fragmented with no logical structure.

**0 marks:**

No relevant content.

#### Indicative content

the current in the electrical circuit is varying

the current passes through the coil

the coil experiences a force (inwards or outwards)

reversing the current reverses the force

the size of the current affects the size of the force

the varying current causes the coil to vibrate

the (vibrating) coil causes the cone to vibrate

the vibrating cone causes the air molecules to move

the movement of the air molecules produces the pressure variations in the air needed for a sound wave

the air molecules bunch together forming compressions and spread apart forming rarefactions

6

[9]