**Name of the Student**:_____
**Max. Marks : 19 Marks** **Time : 19 Minutes**

Mark Schemes

## Q1.

(a) (i) microwaves

**1**

(ii) can pass through the ionosphere

*accept travels in a straight line*
*accept atmosphere for ionosphere*
*do **not** accept air for ionosphere*

**1**

(b) higher the frequency, further the wave travels (into the atmosphere before reflection)

**1**

(c) 15 000

*allow **1** mark for correct transformation and substitution*

*ie* $\frac{300\,000\,000}{20}$

*an answer of 15 000 000 only gains **1** mark*
*allow both marks for an answer of 15 MHz (unit must be changed)*
*an answer of 15 gains no credit*

**2**

**[5]**

## Q2.

(a) (i) answer in the range 3.0 ↔ 3.1 inclusive

*accept for 1*
*3.6 ÷ 1.2 or 3.7 ÷ 1.2*
*or 36 ÷ 12 or 37 ÷ 12*
*or 18 ÷ 6 or 18.5 ÷ 6*
*or 10.2 ÷ 3.4 or 102 ÷ 34*
*or answer in the range but with a unit eg 3 cm*

**2**

(ii) (principal) focus / focal (point(s)) / foci / focus

*accept 'focusses'*
*accept focals*
*do **not** accept focal length*

**1**

(iii) at the intersection of virtual / imaginary rays

***or*** *'where virtual / imaginary rays cross'*

***or*** *the rays of (real) light do not cross*

***or*** *the image on the same side (of the lens) as the object*

***or*** *the image is drawn as a dotted line*

***or*** *the image is upright*

*do* ***not*** *accept 'cannot be put on a screen'*

*do* ***not*** *accept any response which refers to reflected rays*

**1**

(b) (i) another correct observation about relationship between values of **d** (1)

(but) not the same relationship between corresponding values for magnification (1)

***example***

*15 is three times bigger than 5 but*

*2.0 is not three times bigger than 1.2*

**2**

(ii) when the distance / **d** increases the magnification increases

***or*** *the converse*

*accept 'there is a (strong)* <u>*positive*</u> *correlation'*

*do* ***not*** *accept any response in terms of proportion / inverse proportion*

**1**

(iii) (student has) no evidence (outside this range)

*accept data / results / facts for 'evidence'*

**1**

**[8]**

## Q3.

(a) sound / mechanical / longitudinal (wave )

**1**

any **one** from:

- above 20 000 hertz / 20kHz
- above (human) audible range
- cannot be heard by humans

**1**

(b) **either**

particles / molecules / fluid vibrate(s) (1)

(and) knock particles of dirt off the jewellery (1)

**or**

by the process of cavitation (1)

*accept 'formation and collapse of tiny bubbles'*

which breaks up / releases dirt from the surface (1)

**2**

(c)***either*** *both pro*
***or*** *both con*
***or*** *one of each*

**either**

two appropriate points gain **1** mark each

**or**

one appropriate point (and) appropriate qualification / amplification

*examples*
*other mammals (sufficiently) similar to humans (1)*
*so results appropriate (1)*
*unethical to experiment on humans (1)*
*so it is better to experiment on mice (1)*
*knowledge / techniques will benefit humans (1)*
*and also other animals (1)*
*experiments were justified because ultrasound has proved useful (1)*

**2**

**[6]**