

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.

- (a) (i) 3 1
- (ii) 30 000 **or** 10 000 × their (a)(i) correctly calculated 1
- (iii) any **two** from:
- frequency is above 20 000 (Hz)
accept the frequency is 30 000
 - frequency is above the upper limit of audible range
 - upper limit of audible range equals 20 000 (Hz)
ignore reference to lower limit
 - it is ultrasound/ultrasonic 2
- (b) (i) wave (partially) reflected 1
- at crack to produce **A** and end of bolt to produce **B**
accept at both ends of the crack 1
- (ii) 0.075 (m) allow **2** marks for time = 0.0000125
allow 1 mark for time = 0.000025
*answers 0.15 **or** 0.015 **or** 0.09 gain 2 marks*
*answers 0.18 **or** 0.03 gain 1 mark*
the unit is not required but if given must be consistent with numerical answer for the available marks 3

[9]**Q2.**

- (a) any **two** from:
- travel (at same speed) through a vacuum / space
*do **not** accept air for vacuum*
 - transverse

- transfer energy
- can be reflected
- can be refracted
- can be diffracted
- can be absorbed
- travel in straight lines

2

(b) can pass through the ionosphere

accept atmosphere for ionosphere

*do **not** accept air for ionosphere*

accept travel in straight lines

accept not refracted / reflected / absorbed by the ionosphere

1

(c) $v = f \lambda$

$$1.2 \times 10^6 / 1200\,000$$

*allow **1** mark for correct substitution*

$$\text{ie } 3.0 \times 10^8 = f \times 2.5 \times 10^2$$

2

hertz / Hz

*do **not** accept hz **or** HZ*

*accept kHz **or** MHz*

*answers 1.2 MHz **or** 1200 kHz gain all **3** marks*

for full credit the unit and numerical value must be consistent

1

[6]

Q3.

(a) two rays drawn from the bulb and reflected by the glass

*angle **I** = angle **R** judged by eye*

*allow **1** mark for one incident and reflected ray even if angle **I** doesn't equal angle **R***

2

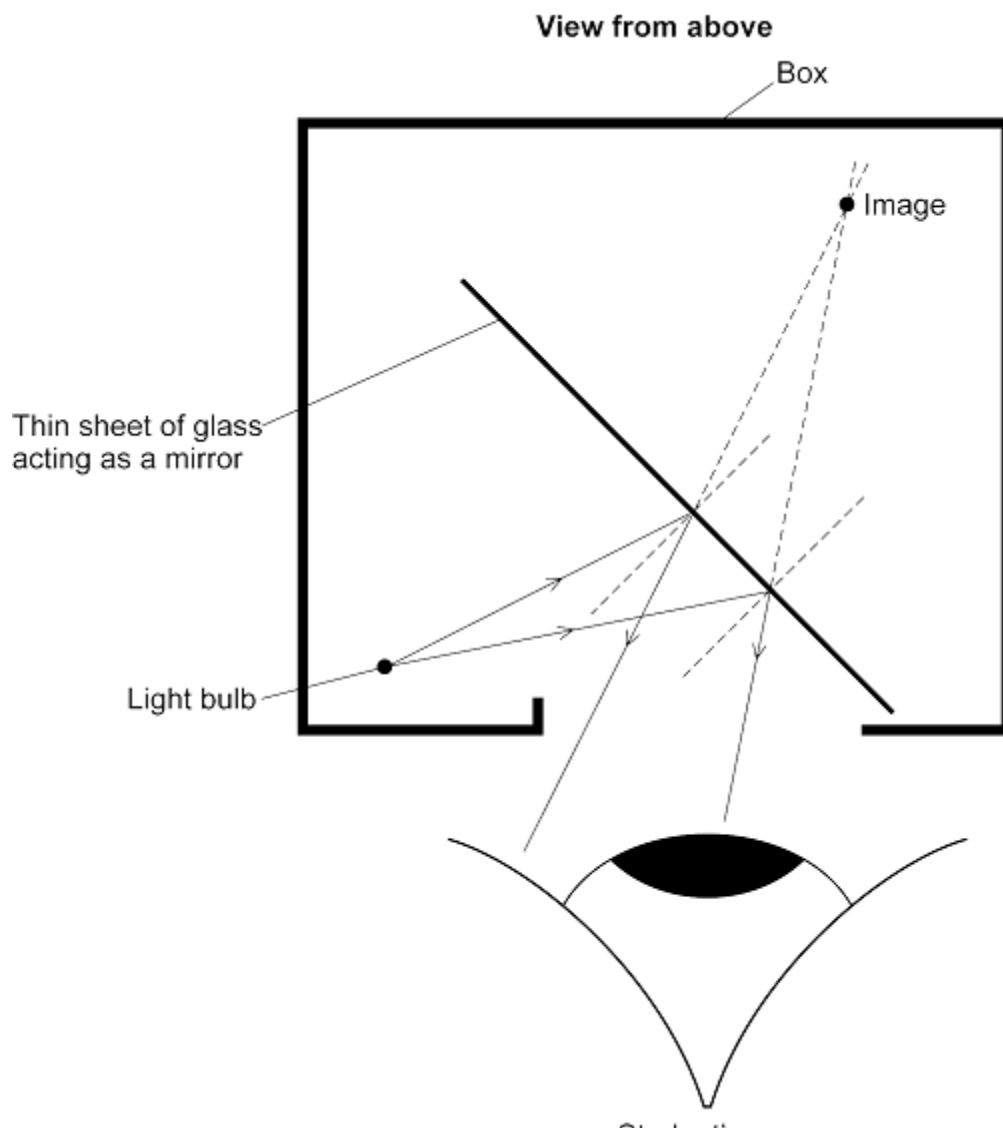
at least one arrow drawn in correct direction

any conflicting arrows negate this mark

ignore any arrows drawn on construction lines behind the glass

1

position of image correct



judged by eye

1

- (b) image is formed by virtual / imaginary rays crossing
accept construction lines only show where the light seems to come from
accept the image is behind the glass / mirror
accept image is seen through the glass / mirror
accept (real) rays of light do not pass through the image
accept (real) rays do not cross
accept the image is a reflection (of the object)
accept the image is formed by reflection
*do **not** accept a virtual image can't be formed on a screen*
*do **not** accept the object / image is reflected*

1

[5]