

Name of the Student: _____

Max. Marks : 21 Marks

Time : 21 Minutes

Mark Schemes

Q1.

- (a) ultrasound is not ionising
allow ultrasound does not harm the (unborn) baby 1

but X-rays are ionising 1

so X-rays increase the health risk to the (unborn) baby
accept specific examples of health risks, eg cancer, stunted growth, impaired brain function etc
X-rays are dangerous is insufficient 1

- (b) ultrasound/waves are partially reflected
(when they meet a boundary) (between two different media / substances / tissues)
must be clear that not all of the wave is reflected 1

the time taken is measured (and is used to determine distances) 1

- (c) 1600 (m/s)
800 (m/s) gains 2 marks
160 000 (m/s) gains 2 marks
0.0016 (m/s) gains 2 marks
allow 2 marks for

$$\frac{0.04}{25 \times 10^{-6}}$$

or

$$\frac{0.08}{50 \times 10^{-6}}$$

80 000 (m/s) gains 1 mark
0.0008 (m/s) gains 1 mark
allow 1 mark for

$$\frac{0.04}{25}$$

or

$$\frac{0.08}{50}$$

allow **1** mark for evidence of doubling the distance or halving the time

3

- (d) (i) they are absorbed by bone
allow stopped for absorbed
X-rays are reflected negates this mark

1

they are transmitted by soft tissue
allow pass through for transmitted
allow flesh / muscle / fat
accept less (optically) dense material for soft tissue

1

(the transmitted) X-rays are detected

1

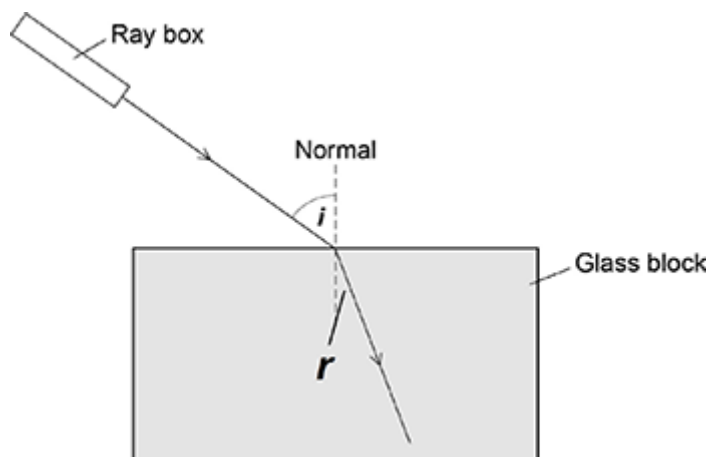
- (ii) short
accept small

1

[12]

Q2.

- (a) (i)



1

- (ii) 1 degree

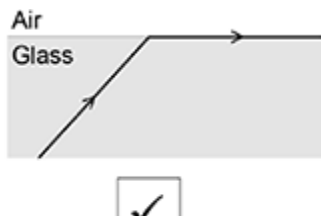
1

- (iii) 1.6

allow **1** mark for correct substitution, ie $0.80 / 0.5$ provided no subsequent step shown
working showing $1.59(9 \dots)$ scores zero

2

- (b) 2nd diagram ticked



1

(c) (i) any **one** correct description:

- upright
- virtual
- diminished.

treat multiple words as a list

1

(ii) 0.25

allow 1 mark for correct substitution, ie 1 / 4 or 5 / 20 provided no subsequent step shown

ignore any unit

2

(iii) Correcting short sight

1

[9]