

Question number	Answer	Notes	Marks
8 (a) (i)	reflection;		1
(ii)	substitution into speed = distance / time;  rearrangement; evaluation of correct total distance; halved to find distance to fish;  e.g. $1500 = \text{distance} / 0.043$ $\text{distance} = \text{speed} \times \text{time}$ $(\text{distance} =) 64.5$ $(\text{distance} = 64.5 \div 2) = 32 \text{ (m)}$	ignore units condone incorrect conversion of time from 43 ms i.e. 43, 43/60, $43 \times 1000$ , $43 \times 60$  accept wherever applied i.e. to the time or to the distance travelled.  64.5, 65 = 3 marks (no halving) 32250 etc = 3 marks (POT) 64500 etc = 2 marks (POT and no halving)	4
(b) (i)	$3.0 \pm 0.5 \text{ (cm)}$ ;	accept '3'	1
(ii)	any three from: MP1. all frequencies show reduction in amplitude or intensity with distance; MP2. this reduction is non-linear;  MP3. penetration decreases with increasing frequency;  MP4. use of data from graph to justify MP3;	ignore 'inverse proportion' condone '(negative) exponential' however expressed e.g. 2MHz penetrates more than 4 MHz which penetrates more than 10MHz e.g. relative values at a given distance or distances at which the frequencies are at a given value	3

Total for Question 8 = 9 marks