

# EM Waves Uses And their Dangers 1 MS

## QUESTION 1

QUESTIONS	ANSWER	EXTRA INFORMATION	MARKS
a)	microwave		1
b)i)	identical		1
b)ii)	<input type="checkbox"/> increased risk of cancerous growth (between ear and brain) <input type="checkbox"/> complaints of headaches and tiredness		1  1
b)iii)	any two from: <input type="checkbox"/> tests in a laboratory did not give effects of tiredness or headaches <input type="checkbox"/> waves not strong enough to cause long term heat damage to cells <input type="checkbox"/> evidence to link mobile phones and ill health is not reliable		2
Total marks			6

## QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	ultraviolet	accept UV	1
b)i)	360 (minutes) / 6 hours	unit if given must be consistent with numerical answer	1
b)ii)	any one from: <input type="checkbox"/> sunscreen not applied thickly enough <input type="checkbox"/> sunscreen not applied often enough <input type="checkbox"/> sunscreen not applied before sunbathing <input type="checkbox"/> water reduces the protection	do not accept answer in terms of different types of skin alone accept any answer that would lead to a reduction in protection factor  accept any answer to do with differences in the intensity	1

	<p>factor</p> <p><input type="checkbox"/> intensity of Sun depends on time of day or cloud cover</p> <p><input type="checkbox"/> intensity of Sun depends on where you are</p>		
b)iii)	<p>more UV / radiation absorbed by dark skin</p> <p>less UV penetrates deep to damage (living) cells / tissue</p>	<p>accept darker skin has more melanin / pigment</p> <p>do not accept sunlight or heat for ultraviolet</p>	<p>1</p> <p>1</p>
c)	<p>so people can make up their own minds about the potential risk to their health</p>	<p>accept 'so people know to take precautions'</p> <p>do not accept 'might get skin cancer'</p> <p>on its own</p>	1
Total marks			6

### QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	digital	correct answer only	1
a)ii)	(visible) light infra red	answer in either order	2
b)i)	25 (%)	do not accept ¼	1
b)ii)	increases		1
c)	tick ( <input type="checkbox"/> ) in top and bottom box	both required	1
d)	<p>SHINY surfaces are good reflectors of infra-red radiation</p> <p>or</p> <p>black surfaces are POOR reflectors of infra-red radiation</p> <p>or</p> <p>black surfaces are good EMITTERS</p>	<p>accept white for shiny</p> <p>accept bad for poor</p> <p>accept insertion of 'not' before 'good' in statement</p>	1

	of infra-red radiation or black surfaces are good ABSORBERS of infra red radiation		
Total marks			7

#### QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	shorter than		1
a)ii)	increase slightly		1
b)i)	go up in the same ratio or (directly) proportional or as speed (of the tennis ball) increases so does the (difference in) frequency	accept as one goes up, so does the other accept positive correlation	1
b)ii)	20 (m/s)	allow 1 mark for showing correct method on graph (ie horizontal or vertical line anywhere on graph) if indicated by a cross, must be $\pm$ half square of correct value)	2
b)iii)	frequency and speed are both continuous variables		1
Total marks			6

#### QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	85		1
b)i)	thickness (of glass)	accept how thick the glass is do not accept light intensity	1
b)ii)	transmits less infra red	accept radiation / or heat for	1

	infra red has a heating effect or infra red warms the room	infra red accept transmits less energy (at all wavelengths) accept (glass B) absorbs more infra red accept infra red is the same as heat ignore reference to visible light ignore references to conservatory keeping cool	1
c)	Z		1
Total marks			5

### QUESTION 6

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	microwaves		1
a)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)	15000	allow 1 mark for correct transformation and substitution ie 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
Total marks			5

**QUESTION 7**

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	higher frequency or shorter wavelength or greater energy	general properties / uses are neutral do not accept different frequency /  wavelength / energy	1
b)	the same (speed)	accept they travel at the speed of light	1
c)	pass through / transmitted by the plastic / casing reflected by the metal / plates	do not accept bounce / deflected etc for reflected if neither marking point scores an answer reflected (back to boat / from the device) scores 1 mark	1  1
Total marks			4