

Q1. (2019)

a)

01.3	(there are no wires) to get tangled / disconnected	allow easier to move arms allow wires are inconvenient allow easier to transfer data	1	AO3 6.6.2.4	E
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b)

01.4	wave speed = frequency × wavelength	allow $v = f \lambda$ allow any correct re-arrangement	1	AO1 6.6.1.2	E
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c)

01.5		an answer of 0.125 (m) or 0.13 (m) scores 3 marks		AO2 6.6.1.2	E
	$300\,000\,000 = 2\,400\,000\,000 \times \lambda$		1		
	$\lambda = \frac{300\,000\,000}{2\,400\,000\,000}$		1		
	$\lambda = 0.125 \text{ (m)}$	allow $\lambda = 0.13 \text{ (m)}$	1		

d)

01.6	range is far enough (for most uses)		1	AO3 6.6.2.4	E
	power is not too great so the battery will not drain quickly	allow power not too great so the phone will not overheat allow the range per milliwatt is greatest or 4 metres	1		

Q2. (2020)

05.1	X-rays are absorbed by bone		1	AO1 6.6.2.4	
	but can pass through flesh	ignore skin	1		

Q3. (2020)

05.2	taking lots of X-rays would give a large dose		1	AO3 6.6.2.3	
	which would increase the radiographer's risk		1		
	the screen absorbs some of the X-rays	allow screen reduces the risk/dose received by the radiographer	1		

Q4. (2020)

05.3	electrical current / oscillations in the transmitter producing radio waves		1	AO1 6.6.2.3
	radio waves are absorbed by the receiver inducing electrical current / oscillations in the receiver		1	
	at the same frequency	if no other mark is awarded, allow 1 mark for radio waves transfer information/energy through the air	1	

Q5. (2021)

05.2	visible light		1	AO3 6.6.2.1
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Q6. (2023)

01.1	A radio waves		2	AO1 6.6.2.1
	B microwaves			
	C X-rays	allow 1 mark if 2 correct		

Q7. (2023)

01.2	Similarity		1	AO1 6.6.2.2
	any one from: <ul style="list-style-type: none"> • same speed (in a vacuum) • both transfer energy • both transverse 	allow both can travel through a vacuum allow both are ionising allow both can harm living tissue allow both can be used for medical treatment / imaging		
	Difference		1	
	any one from: <ul style="list-style-type: none"> • gamma has a higher frequency • gamma has a shorter wavelength • gamma is more ionising • gamma is more penetrating 	allow gamma has more energy		

Q8. (2024)

03.3	microwaves	allow radio waves	1	AO1 6.6.2.4
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Q9. (2024)

03.4	violet	allow purple	1	AO1 6.6.2.1
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