Your Science Online

Cambridge IGCSE Physics 0625 style

WAVES – MARK SCHEME

Maximum mark: 45 (Core: 32). ";" separates marking points. Accept correct alternative wording. Apply error carried forward (ecf) where shown. Do not award a final-answer mark if the unit is wrong or missing, unless the unit is printed on the answer line.

Question	Answer	Marks	Guidance
1(a)	transverse: vibrations are at right angles (perpendicular) to the direction the wave travels; longitudinal: vibrations are parallel to (along) the direction the wave travels;	2	allow: direction of energy transfer for direction of travel
1(b)(i)	2.4 (cm);	1	do not allow: 4.8 cm
1(b)(ii)	20 (cm);	1	
1(c)	4 / 2.0; 2.0 (Hz);	2	correct answer with no working: 2 marks
1(d)	speed = frequency × wavelength **or** 2.0 × 0.20; 0.40 (m/s);	2	ecf from (b)(ii) and (c) 40 (cm/s) with no conversion: 1 mark only
2(a)	a line joining points on a wave that are in step / a line along a crest;	1	allow: line joining neighbouring points that are moving together
2(b)	diffraction;	1	
2(c)	curved (circular) wavefronts spreading out from the gap; spacing (wavelength) the same as before the gap;	2	at least three wavefronts needed for the second mark
2(d)	it stays the same / does not change;	1	
2(e)	less diffraction / waves spread out less; wavefronts after the gap are mostly straight (plane), curved only at the edges;	2	allow: diffraction is greatest when the gap is about the same size as the wavelength
3(a)	speed decreases; wavelength decreases; frequency stays the same;	3	
3(b)(i)	frequency = speed / wavelength **or** 0.30 / 0.015; 20 (Hz);	2	0.30 / 1.5 = 0.2 scores 0 marks
3(b)(ii)	0.18 / 20 = 0.009 (m); 0.90 (cm);	2	ecf from (b)(i) allow 0.009 m for 1 mark only

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Question	Answer	Marks	Guidance
4(a)	A: microwaves; B: ultraviolet;	2	
4(b)	travel at the same speed in a vacuum / are transverse waves / can travel through a vacuum / transfer energy;	1	allow: travel at 3.0×10^8 m/s in a vacuum
4(c)	microwaves: satellite television / mobile phones / microwave ovens; infrared: remote controls / electric grills / thermal imaging / intruder alarms / optical fibres; X-rays: medical imaging / airport security scanners / killing cancer cells;	3	one mark for each correct use
4(d)	damage to skin cells / skin cancer / sunburn / damage to eyes;	1	do not allow: "radiation sickness"
4(e)	wavelength = 3.0×10^8 / 1.5×10^8; 2.0 (m);	2	
5(a)	air particles vibrate parallel to the direction the wave travels / backwards and forwards; forming compressions (particles close together) and rarefactions (particles spread out);	2	
5(b)	20 Hz to 20 000 Hz;	1	allow: 20 kHz
5(c)	distance travelled = 2 × 85 = 170 (m); 170 / 0.50; 340 (m/s);	3	85 / 0.50 = 170 m/s scores 1 mark only
5(d)	sound needs a medium (particles) to vibrate and there are no particles in a vacuum;	1	
6(a)	P; more waves on the screen / shorter period / higher frequency;	2	second mark depends on the first
6(b)	Q; larger amplitude / taller waves;	2	second mark depends on the first

6(c)	period = 2 squares = 2.0 ms;
	frequency = 1 / 0.002;
	500 (Hz);
		3	allow: 1 / 2.0 ms = 0.5 for 2 marks (unit error)

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