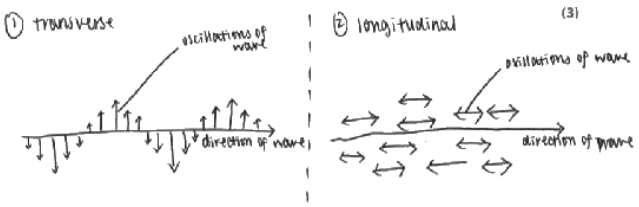
Question number	Answer	Notes	Marks
1 (a) (i)	B (1.0 m); A is incorrect because it is only half the wavelength C is incorrect because it is 1.5 wavelengths D is incorrect because it is 2 wavelengths		1
(ii)	C (4 cm); A is incorrect because it is a quarter of the amplitude B is incorrect because it is half of the amplitude D is incorrect because it is double the amplitude		1
(b)	vibrations / oscillations / disturbance; (are) parallel or perpendicular to direction of energy transfer / wave (travel/movement); correct identification of <u>both</u> types; e.g.  gets 3 marks	allow suitably labelled diagrams	3
(c)	any two from: MP1. speed (in vacuo); MP2. idea that they don't need a medium to propagate; MP3. can all be reflected / refracted / diffracted; MP4. all carry energy / information;	allow quoted speed 3.0×10^8 m/s allow can travel through vacuum apply positive marking, not list marking	2

(d) (i)	A (gamma rays); B is incorrect because infrared is not ionising enough C is incorrect because microwave is not ionising enough D is incorrect because radio is not ionising enough		1
(ii)	D (visible light); A is incorrect because microwave is not visible to humans B is incorrect because radio is not visible to humans C is incorrect because ultraviolet is not visible to humans		1
(iii)	any two from: MP1. idea that x-rays are ionising / cause cell damage; MP2. idea that risk increases with greater exposure; MP3. idea that exposure reduced by increasing distance away;	allow x-rays dangerous to health cause cancer unqualified “dangerous”/”harmful” is insufficient allow “to avoid excessive exposure” allow exposure reduced by shielding of walls	2

Total for question 1 = 11 marks