Question number	Answer	Notes	Marks
11 (a)	A; A is the only correct answer B is incorrect because the amplitude of the alpha wave should be smaller than the amplitude of the delta wave C is incorrect because the frequency of the alpha wave should be higher than the amplitude of the delta wave D is incorrect because the amplitude of the alpha wave should be shorter than the amplitude of the delta wave and the frequency should be higher		1
(b)	B; B is the only correct answer A is incorrect because the motion arrows do not show vibrations C is incorrect because the motion arrows do not show vibrations D is incorrect because the motion arrows show vibrations, but in the wrong orientations compared to the direction of wave travel		1
(c)	any four from: MP1. rays A, B and C are refracted (at the boundary); MP2. A is un-deviated; MP3. C is more deviated than B; MP4. angles of incidence increase from A to B to C to D; MP5. ray D undergoes (total internal) reflection; MP6. ray D angle of incidence > critical angle;	 allow rays B and C refracted allow correct description of refraction e.g. 'rays B and C bend away from the normal' allow A does not change direction ignore A does not refract allow C bends more than B allow ray D undergoes TIR	4

Total for question 11 = 6 marks