1	(a)	Describe the piezoelectric effect.						
					[1]			
(	(b)	Describe how ultrasound scanning is used to obtain diagnostic information about internal structures of a body. In your description include the differences between an A-scan and a B-scan.						
					[4]			
	(c)	Fig. 7. bone.	1 shows the speed of ultrasou	nd, density and acou	stic impedance for muscle and			
r	material		speed of ultrasound / ms <sup>-1</sup>	density / kg m <sup>-3</sup>	acoustic impedance / 10 <sup>6</sup> kg m <sup>-2</sup> s <sup>-1</sup>			
ļ	mus	scle	1590	1080	1.72			
	bone		4080	1750	7.14			
			F	Fig. 7.1				
		(i) Sh	now that the unit for acoustic imp	pedance is $kg m^{-2} s^{-1}$ .				
		()	·	G				
					[1]			
		` '	n ultrasound pulse is incident at r		•			
		Ca	alculate the fraction of reflected i	ntensity of the ultrasol	una.			

(iii)	What is meant by acoustic impedance matching? Explain why a gel is used to produce an effective ultrasound image.				
	rol				
	[2]				
(iv)	The frequency of the ultrasound in the muscle is 1.2MHz. Calculate the wavelength of the ultrasound in millimetres (mm).				
	wavelength = mm [2]				
(v)	Suggest why it is desirable to have ultrasound of short wavelength for a scan.				
	[1]				
	[Total: 13]				

2 (a)		ges of internal body structures.
	-	your answer, you should make clear how the appearance of the image is linked to the inniques used.
		[5]
(b)	sug 	tudent suggests an image intensifier uses the photoelectric effect. Explain why this gestion is <b>incorrect</b> .
		[1]
(c)	(i)	Explain how the production of a CAT scan image differs from that of a simple X-ray image.
		[2]
	(ii)	Describe the advantages of a CAT scan compared to an X-ray image.
		[2]