

Question	Answer	Marks
2(a)	0	B1
2(b)	$pV = nRT$	C1
	$(n =) 1.5 \times 10^5 \times 4.2 \times 10^{-3} / 8.31 \times 540$ $= 0.14 \text{ mol}$	
2(c)	missing pressure 1.5 ($\times 10^5$)	B1
	both missing volumes 1.8 ($\times 10^{-3}$)	B1
2(d)(i)	(ΔU): increase in internal energy (of the system)	B1
	(q): thermal energy supplied to the system	B1
	(W): work done on system	B1

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Question	Answer	Marks
2(d)(ii)	volume increases and work is done by the gas	B1
	temperature decreases and internal energy decreases	B1

Question	Answer	Marks
10(a)	energy = $mc\Delta T$	C1
	energy = ItV	C1
	$(\Delta T =) \frac{0.40 \times 0.020 \times 75\,000 \times 0.95}{0.015 \times 130}$ =290 K	A1
10(b)	$I = I_0 e^{-\mu t}$	C1
	$0.20 = e^{-0.22t}$ $t = 7.3 \text{ cm}$	A1

Question	Answer	Marks
10(c)	<i>either</i>	M1
	(linear) attenuation coefficients / μ very different for bone and muscle	A1
	(very) different amounts (of X-rays) absorbed so good contrast or (very) different intensities transmitted so good contrast	A1
	<i>or</i>	(M1)
	(linear) attenuation coefficients / μ similar for blood and muscle	(A1)
	similar amounts (of X-rays) absorbed so poor contrast or similar intensities transmitted so poor contrast	(A1)