Question number	Answer	Notes	Marks
3 (a)	B – sound waves are transverse;		1
(b) (i)	calculation of time period; substitution into correct frequency equation; evaluation; e.g. (time period / *T*) = 0.02 (s) (*f* =) 1/0.02 (*f* =) 50 (Hz)	 allow ecf for incorrect time period allow 0.02 seen anywhere 16.7, 100 (Hz) get 2 marks max.	3
(ii)	line drawn has smaller amplitude than existing line throughout; line drawn has higher frequency (pitch) throughout;	ignore vertical position of line	2

Total for question = 6 marks

Question number	Answer	Notes	Marks
5 (a)	conversion of hours to seconds; substitution and rearrangement of equation; evaluation; e.g. time = 40 x 60 x 60 (= 144 000 (s)) energy = 50 x 144 000 (energy) = 7 200 000 (J)	 no mark for equation as given in paper seen anywhere in working allow 2 000, 120 000 (J) for 2 marks	3
(b)	MP1. energy is wasted / lost (to the surroundings) as thermal energy; MP2. idea that light energy (output) is less than the electrical / input energy;	ignore statements about student being right/wrong allow heat allow RA e.g. 'heat is not useful' e.g. 'not all electrical energy is converted to light'	2
(c)	MP1. two coils of wire; MP2. iron core; MP3. more turns (of wire) on the primary coil than on the secondary coil;	marks can be awarded from diagram if clear allow 'magnetically soft' core allow input for primary and output for secondary	3
(d) (i)	input power = output power;	allow $V_P I_P = V_S I_S$ rearrangements Use of 1,2 in place of P,S	1
(ii)	substitution into a correct equation; rearrangement; evaluation; e.g. 230 x I_P = 12 x 4.2 (I_P =) 12 x 4.2/230 (I_P =) 0.22 (A)	 0.21 (A) gets 2 marks only allow 0.2, 0.21913…	3

Total for question = 12 marks