

7(a)	(induced) e.m.f. is (directly) proportional to rate
	of change of (magnetic) flux (linkage)
7(b)(i)	flux = e.m.f. $\times$ time
	flux = 0.54×15 $= 8.1 \text{ Wb}$
7(b)(ii)	$\Phi = BA$
	area = $8.1 / (38 \times 10^{-6})$ $= 2.1 \times 10^5 \text{ m}^2$
7(b)(iii)	area = speed $\times$ time $\times$ width
	$v = (2.1 \times 10^5) / (15 \times 68)$ $= 210 \text{ m s}^{-1}$
7(b)(iv)	opposing force (due to current in wings) must be backwards
	from Fleming's left-hand rule, current (in wings) must be from Q to P
	current is from $-$ to $+$ inside an e.m.f. source so P is at higher potential

7(a)(i)	loss of energy (of oscillations)
	due to resistive forces
7(a)(ii)	amplitude (of oscillations) decreases gradually or oscillations continue (for several periods)
	cutting of (magnetic) flux causes induced e.m.f. (in coil) or induced e.m.f. causes current (in resistor / circuit)
7(a)(iii)	current causes dissipation of thermal energy in resistor or current in resistor causes dissipation of thermal energy
	thermal energy comes from energy of oscillations
	(for any given e.m.f.) current is lower so thermal energy dissipated at a lower rate or (for any given e.m.f.) current is lower so the resistive force is lower
7(b)	oscillations are less damped or smaller decrease in amplitude of oscillations (in each period) or oscillations continue for longer

7(a)	(induced) e.m.f. is (directly) proportional to rate
	of change of (magnetic) flux (linkage)
7(b)(i)	(uniform acceleration so) velocity is (directly) proportional to time
	(Fig. 7.2 shows) e.m.f. is (directly) proportional to time so E is proportional to v .

7(b)(ii)	($v = at$ so) distance moved in time $\Delta t = at\Delta t$
	$\Phi = BA$
	$E = (\Delta\Phi / \Delta t) = B \times L \times (at\Delta t) / \Delta t = BLat$
7(b)(iii)	$B = (0.30 \times 10^{-3}) / (0.45 \times 7.8 \times 2.0)$
	$= 4.3 \times 10^{-5} \text{ T}$