HKDSE Essentials: Physics Exam Exercises
Electricity and Magnetism

Updated on 3 Jan, 2013.

Amendments (main book):

E4

E4 p.58 #18	a current	READS	a current of 10 A
E4 p.62 ans #5a	*Y*, *X*	READS	*Y*, *Y*
E4 p.62 ans #7c	3.46 N	READS	0.346 N
E4 p.64 ans #1d	farther	READS	A
E4 p.65 #3d	The value in (b)	READS	the value in (c).
E4 p.65 ans #3a	+ve	READS	no
E4 p.65 ans #5d	8.47×10^5 m s^{-1}	READS	8.74×10^5 m s^{-1}

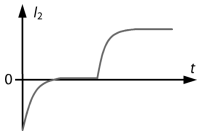
E5

E5 p.76 #15(2)	*YZ* experiences a magnetic force to the right.
E5 p.79 #31 Fig.	Reverse the winding of the leftmost coil.

E6

E6 p.91 #12	The line should read: $\langle P\rangle = \langle I^2R\rangle = \langle I^2\rangle R = I_{rms}^2 R = V_{rms}^2/R = V_{rms} I_{rms}$ Delete the sidenote.		
E6 p.94 #6(3)	4 times	READS	1/4 times
E6 p.95 ans #12	C	READS	A
E6 p.97 ans #25	C	READS	B
E6 p.99 #3	90%	READS	95%
E6 p.100 #6b	peak value	READS	r.m.s. value
E6 p.102 ans #5b	$V_0^2/\sqrt{2}$	READS	$V_0/\sqrt{2}$
E6 p.103 #4	6 V battery	READS	8 V battery
E6 p.104 #6	3 *V* / 5	READS	3 *V* / 8
E6 p.104 #9	r.m.s.	READS	peak

E7

E7 p.108 #4	Assume that the –ve terminal of the cell is earthed.		
E7 p.109 #8(3)	at a constant rate	READS	inversely proportional to time
E7 p.112 #5 Fig.			

E8

E8 p.122 #3	'220 V, 2000 W'	READS	'220 V, 2200 W'
E8 p.122 ans #4a	grav. force	READS	elec. force
E8 p.123 #5	diameter 50 cm	READS	radius 50 cm

Appendix

A p.133 ans (Ex1)	3a. $(4\pi\varepsilon_0)Fr^2/Q_2$	3b. $\sqrt{Q_1Q_2/(4\pi\epsilon_0 F)}$	
A p.133 ans (Ex2)#3	0.09 Ω	READS	0.09 A
A p.137 ans (Ex1)#2	1.2 Ω	READS	1 Ω
A p.141 ans (Ex4)#6	+*y*	READS	–*y*
A p.143 ans (Ex4)#5	same	READS	1:2

Amendments (solution guide):

E4

E4 p.23 #7c	$F_B = (0.4)(10)$**(0.1)** $\sin 60° \approx$ **0.346** N
E4 p.24 #12c	The note in #10b should be moved here.
E4 p.26 #9 last line	The force on *Y* is larger than that on *X*.

E5

E5 p.29 #10	The 3rd note in #15 should be moved here.
E5 p.29 #17 last line	So, (1) and (3) are also correct.
E5 p.32 #4a	*B* should read B_x.
E5 p.33 #9b	Delete the values on the vertical axis.
E5 p.36 #9 last line	Change the subscripts as follows. $I_2 : I_3 = R_3 : R_2$ and $I_1 = I_3 + I_2 = (1 + R_2/R_3)\, I_2 > I_2$.
E5 p.38 #13a	F_B should point to the right horizontally. *R* is always $\perp$ the direction of motion of the rod. *W*'s and F_B's components $\parallel$ to the tracks do work on the rod.

E6

E6 p.40 #12	The answer should be A.
E6 p.41 #25	The answer should be B.
E6 p.45 #4	Change the voltage V_Y to 6 V and get $V = 8$ V and $P_Y = 2.4$ W.
E6 p.45 #6 last line	The voltage of the power supply should be $V = V_A + V_p = (2/3)V_B + 2V_B$. Solving, we get $V_B = (3/8)V$.
E6 p.45 #9 last para.	As half of the curve is chopped, the mean of the V^2 is halved.

E7

E7 p.46 #11 last line	$I_0^2 R = (2\sqrt{3} \times 10^{-3})^2 \times 10 = 0.12$ mW.

E8

E8 p.52 #4a(i)	$9.11e-31$ should read 9.11×10^{-31}.

Dessert

Dessert p.54 #3 line 1	Grav. field lines *terminate at* a mass, not *originate from* it ($\because$ masses always attract each other).

Notes (solution guide):

E5

E5 p.29 #15(2)

Alternative:
(2) is correct, as the induced I flows from X to W and from Z to Y, by Fleming's LH rule, YZ experiences a magn. force to the right.

E5 p.37 #10

Alternative:
The induced e.m.f. in a square loop $\xi = kA = kL^2$.
The total resistance of a square loop $R = k'L$.
Thus, the induced current in a square loop $I = \xi/R = k''L$.
By this, we may guess that $I_1 > I_2$ and I' flows upwards.

E6

E6 p.39 #6(2)

Alternative:
(2) is *incorrect* since

	V_1	$N_1 : N_2$	V_2	I_2	I_1
P	12 V	2 : 1	6 V	$6/R$	$3/R$
Q	12 V	4 : 2	3 V	$3/R$	$3/(4R)$

E6 p. 39 #7(1)

Alternative:
(1) is *incorrect* as copper is not a magnetic material.

E6 p.41 #25 (3)

Alternative:
(3) is *incorrect* since the current passes thro' the heating element.

E6 p.41 #29

Alternative:
Note that the metal case must be connected to the live wire, and not earthed.
So, S_3 and S_2 must be closed, and S_1 must be opened.

E6 p.44 #4b Fig.

Alternative:
The upper bulb could also be connected directly across the lower bulb without an extra switch.

E6 p.45 #9

Alternative:
$P_{\text{half}} = 0.5P_{\text{full}} = 0.5(V_0/\sqrt{2})^2/R = 0.09$ W.