



Summary Answer Sheet

Student Code

Theory

Question

I

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Question	Answer	Maximum Marks
I.1	$v_T = \frac{mg}{k}$	0.5
I.2	$z(t) = \frac{mg}{k} \left[t + \frac{m}{k} (e^{-kt/m} - 1) \right]$	1.0
I.3	$e_i = vB_a 2\pi a$ <p>where</p> $B_a = \frac{\mu_0}{4\pi} \frac{3pa(z_0 - z)}{[a^2 + (z_0 - z)^2]^{5/2}}$	1.5
I.4	$f_{em} = i2\pi a B_a$ <p>where</p> $B_a = \frac{\mu_0}{4\pi} \frac{3pa(z_0 - z)}{[a^2 + (z_0 - z)^2]^{5/2}}$	1.0
I.5	Magnitude of the force = f_{em}	0.5
I.6	$e_i = L \frac{di}{dt} + iR$	0.5



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I.7	<p>The potential energy is converted into</p> <ol style="list-style-type: none"> 1. $mv^2/2$ (kinetic energy) 2. $Li^2/2$ (magnetic energy) 3. $i^2R\Delta t$ (Joule loss due to the current in time Δt) 	1.0				
I.8	<p>Tick in appropriate box.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tbody> <tr> <td style="padding: 5px;">Yes</td> <td style="width: 30px; height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">No</td> <td style="width: 30px; height: 20px; text-align: center; vertical-align: middle;">√</td> </tr> </tbody> </table>	Yes		No	√	0.5
Yes						
No	√					
I.9	<p>Resistance = $\frac{2\pi a}{\sigma w \Delta z'}$</p>	0.5				
I.10	$k = \left(\frac{\mu_0}{4\pi}\right)^2 \frac{18p^2\pi\sigma w}{a^4} \int_{-\infty}^{\infty} \frac{u^2}{(1+u^2)^5} du$	2.0				
I.11	$k = \frac{\mu_0^2 p^2}{a^4 R_0}$	1.0				