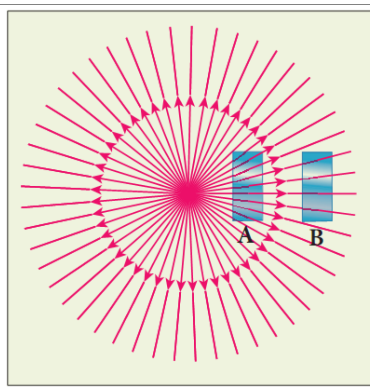
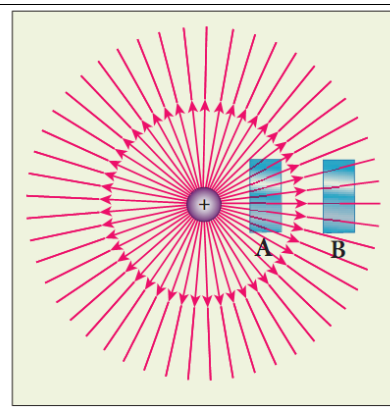
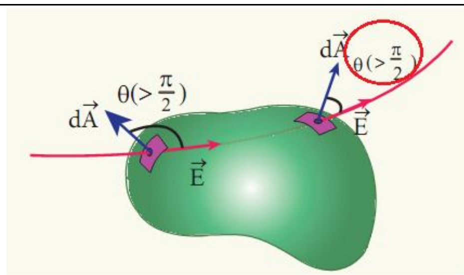
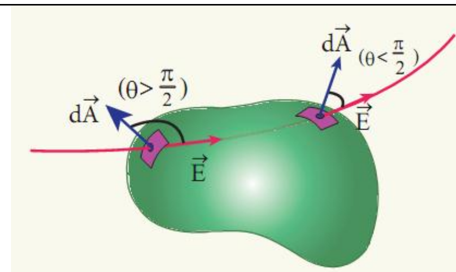
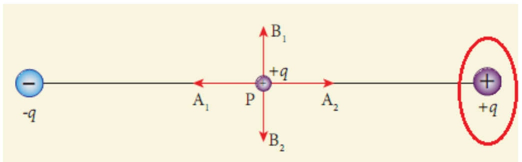
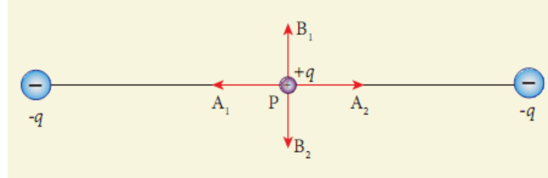
+2 Physics- Volume 1 (English medium)

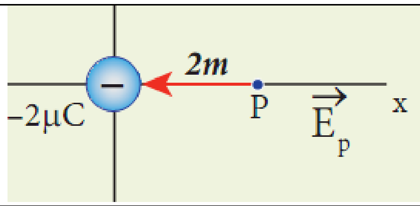
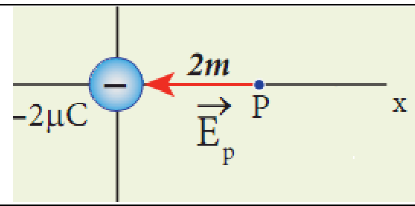
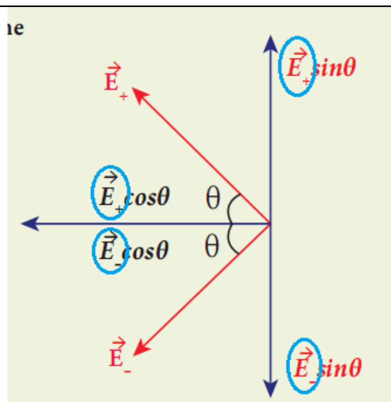
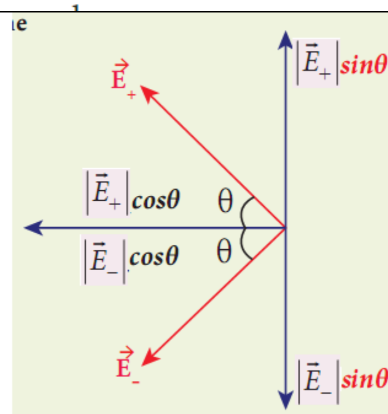
Errata (as on 08-07-19)

(Prepared by textbook authors team)

Unit 1(English medium)

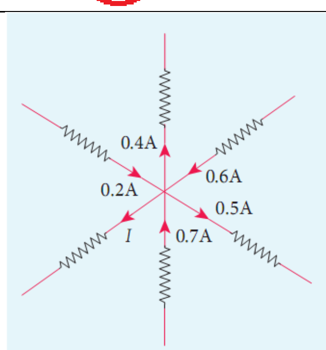
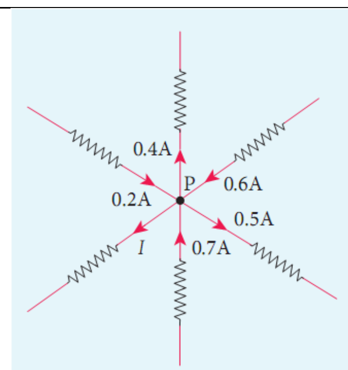
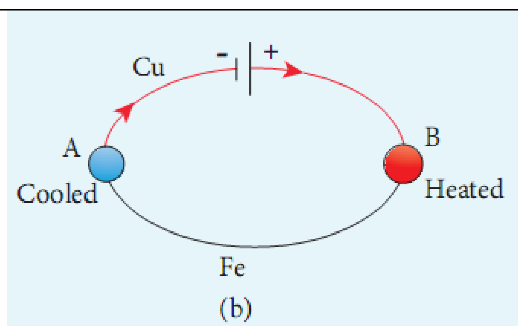
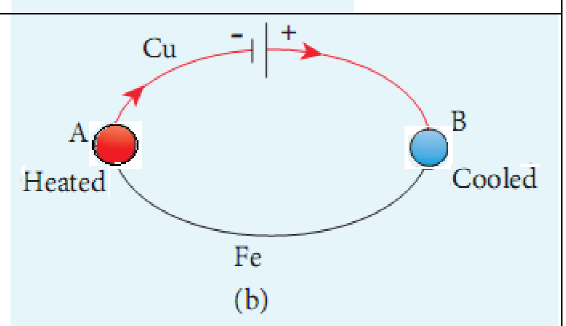
S.No	Page No	Error	Correction
1	7	**EXAMPLE 1.3** Two small-sized identical equally charged spheres, each having mass 1 mg are hanging	**EXAMPLE 1.3** Two small-sized identical equally charged spheres, each having mass 1g are hanging
2	9	$\dots + \frac{q_1 q_2}{r_{n1}^2}\hat{r}_{n1}\Big\}$ (1.3)	$\dots + \frac{q_1 q_n}{r_{n1}^2}\hat{r}_{n1}\Big\}$ (1.3)
3	16	$= -3.95\times10^{20}\left(\hat{i}+\hat{j}\right)N$	$= -3.95\times10^{20}\left(\hat{i}+\hat{j}\right)N\,kg^{-1}$
4	19	 **Figure 1.13** Electric field has larger magnitude at surface A than B	 **Figure 1.13** Electric field has larger magnitude at surface A than B
5	29	**(c)** Calculate the work done to bring a test charge +2μC from infinity to the point P. Assume the charge +9μC	**(c)** Calculate the work done to bring a test charge +2μC from infinity to the point Q. Assume the charge +9μC
6	30	**(c)** The electric potential V at a point P due to some charge is defined as the work done by an external force to bring a unit positive charge from infinity to P. So to bring the q amount of charge from infinity to the point P, work done is given as follows.	**(c)** The electric potential V at a point Q due to some charge is defined as the work done by an external force to bring a unit positive charge from infinity to Q. So to bring the q amount of charge from infinity to the point Q, work done is given as follows.

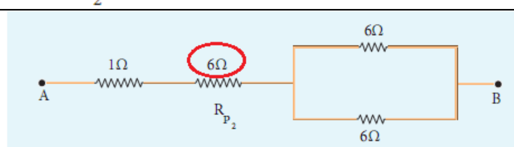
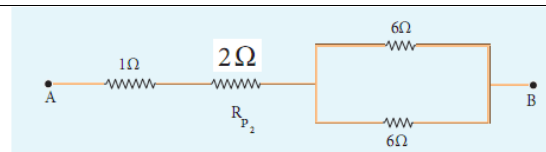
7	36	$W_s = -\frac{1}{4\pi\varepsilon_\circ}\frac{q}{a}\left(2-\frac{1}{\sqrt{2}}\right)$	$W_s = -\frac{1}{4\pi\varepsilon_\circ}\frac{q^2}{a}\left(2-\frac{1}{\sqrt{2}}\right)$
8	40		
9	73		
10	74	(a) 10 J (b) – 20 J (c) +20 J (d) -10J	(a) 10 V (b) – 20 V (c) +20 V (d) -10 V
11	75	**1)** b **2)** c **3)** d **4)** b **5)** a **6)** b **7)** c **8)** a **9)** b **10)** b	**1)** b **2)** c **3)** d **4)** b **5)** a **6)** b **7)** c **8)** a **9)** c **10)** b
12	77	Ans: $F_e = 9 \times 10^{61}$ N, W = 588 N	$F_e = 23 \times 10^{23}$ N, W = 588 N, $\frac{F_e}{W} = 3.9\times10^{21}$
13	78	Ans: ΔU = -3.246 J, negative sign implies that to move the charge -2μC no external work is required. System spends its stored energy to move the charge from point a to point b.	Ans: ΔU = **+1.12** J, **Positive** sign implies that to move the charge -2μC external work is required.
14	79	(d) across PQ: $\frac{C_1C_2C_3+C_2C_3C_4+C_1C_2C_4+C_1C_3C_4}{(C_1+C_2)(C_3+C_4)}$ across RS: $\frac{C_1C_2C_3+C_2C_3C_4+C_1C_2C_4+C_1C_3C_4}{(C_1+C_2)(C_3+C_4)}$	(d) across PQ: $\frac{C_1C_2C_3+C_2C_3C_4+C_1C_2C_4+C_1C_3C_4}{(C_1+C_3)(C_2+C_4)}$ across RS: $\frac{C_1C_2C_3+C_2C_3C_4+C_1C_2C_4+C_1C_3C_4}{(C_1+C_2)(C_3+C_4)}$
15	2	**(iii)** The charged amber rod attracts the	**(iii)** The charged rubber rod attracts the
16	14	$\vec{E}_R = 0.56\times10^3\hat{i}\, NC^{-1}$	$\vec{E}_Q = 0.5\times10^3\, N\, C^{-1}\hat{i}$

17	14		
18	17	$\vec{E} = \frac{1}{4\pi\varepsilon_\circ}\int \frac{\sigma da}{r^2}\hat{r} = \frac{1}{4\pi\varepsilon_\circ}\sigma\int \frac{da}{r^2}\hat{r}$	$\vec{E} = \frac{1}{4\pi\varepsilon_\circ}\int \frac{\sigma dA}{r^2}\hat{r} = \frac{1}{4\pi\varepsilon_\circ}\sigma\int \frac{dA}{r^2}\hat{r}$
19	34	$\vec{E} = -\left(\frac{\partial V}{\partial x}\hat{i} + \frac{\partial V}{\partial y}\hat{j} + \frac{\partial V}{\partial k}\hat{k}\right)$ (1.44)	$\vec{E} = -\left(\frac{\partial V}{\partial x}\hat{i} + \frac{\partial V}{\partial y}\hat{j} + \frac{\partial V}{\partial z}\hat{k}\right)$ (1.44)
20	35	The electrostatic potential is	The electrostatic potential energy is
21	57	$\varepsilon_o = 8.85 \text{ x } 10^{-12} \text{ Nm}^2 \text{ C}^{-2})$	$\varepsilon_o = 8.85 \text{ x } 10^{-12} \text{ N}^{-1}\text{m}^{-2} \text{ C}^2)$
22	66	$\sigma_1 = \frac{80\times10^{-9}}{4\pi\times64\times10^{-4}} = 0.99\times10^{-6}Cm^{-2}$	$\sigma_1 = \frac{80\times10^{-9}}{4\times64\times10^{-4}} = 0.99\times10^{-6}Cm^{-2}$
23	24		
24	79	$t_p = \sqrt{\frac{2hm_e}{eE}} \approx 63ns$	$t_p = \sqrt{\frac{2hm_p}{eE}} \approx 63ns$
25	44	Here $\Phi_E = \int_{\substack{Curved\\surface}} dA$ = total area of the curved	Here $\int_{\substack{Curved\\surface}} dA$ = total area of the curved

Unit 2 (English medium)

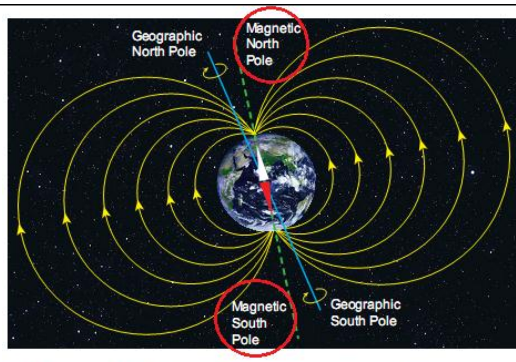
S.No	Page No	Error	Correction

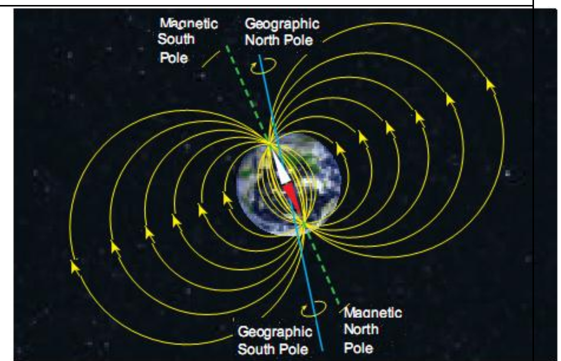
1.	100	$P=\frac{dV}{dt}=\frac{d}{dt}(V.dQ)=V\frac{dQ}{dt}$ (2.31)	$P=\frac{d\mathbf{W}}{dt}=\frac{d}{dt}(V.dQ)=V\frac{dQ}{dt}$ (2.31)
2	122	**Answers** 1) a 2) b 3) c 4) b 5) a	1) a 2) a 3) c 4) b 5) a
3	124	cm long. What is the resistivity of rod between its ends?	Resistance
4	124	Voltage | $V_A=\frac{\xi}{3R}$, $V_B=\frac{\xi}{3R}$, $V_C=\frac{\xi}{3R}$ | $V_A=\frac{\xi}{2R}$, $V_B=\frac{\xi}{2R}$, $V_C=0$	Voltage | $V_A=\frac{\xi}{3}$, $V_B=\frac{\xi}{3}$, $V_C=\frac{\xi}{3}$ | $V_A=\frac{\xi}{2}$, $V_B=\frac{\xi}{2}$, $V_C=0$
5	115	60°C. (The specific heat of water is s = 4200 J kg^{-1}) 115	60°C. (The specific heat of water is s = 4200 J $kg^{-1}K^{-1}$) 115
6	116	$s = 4200\ J\ kg^{-1}$,	$s = 4200\ J\ kg^{-1}K^{-1}$
7	85	**Figure 2.4** Electric current	Figure 2.4 Zig-zag motion and drift velocity
8	93	$V_2 = IR_1 = 2.4\,A\times 6\Omega = 14.4\,V$	$V_2 = IR_2 = 2.4\,A\times 6\Omega = 14.4\,V$
9	108		
10	118		

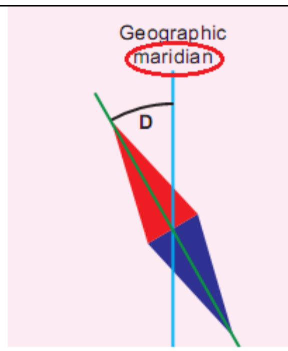
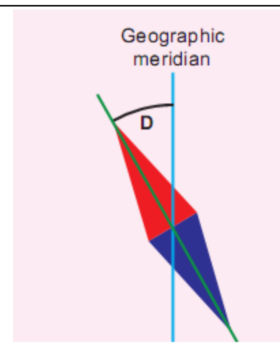
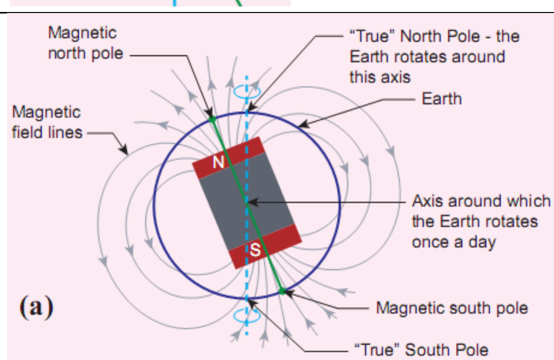
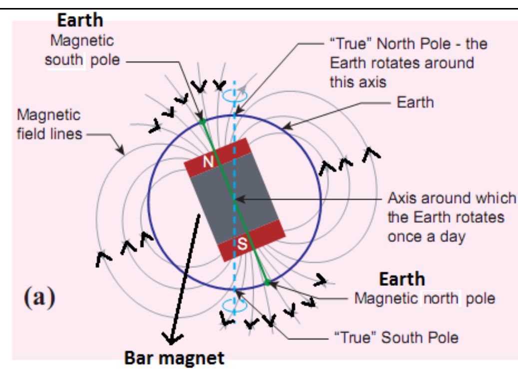
11	124	6. Three identical lamps each having a resistance R are connected to the battery of emf as shown in the figure.	6. Three identical lamps each having a resistance R are connected to the battery of emf ξ as shown in the figure.
12	122	**15.** In Joule's heating law, when I and t are constant, if the H is taken along the y axis and I^2 along the x axis, the graph is a) straight line b) parabola c) circle d) ellipse	**15.** In Joule's heating law, when **R** and t are constant, if the H is taken along the y axis and I^2 along the x axis, the graph is a) straight line b) parabola c) circle d) ellipse
	94	$I_1 = \frac{V}{R_1} = \frac{24V}{6\Omega} = 6A$ $I_2 = \frac{V}{R_2} = \frac{24}{6} = 4A$	$I_1 = \frac{V}{R_1} = \frac{24V}{4\Omega} = 6A$ $I_2 = \frac{V}{R_2} = \frac{24}{6} = 4A$
13	95		
14	122	**9.** In a large building, there are 15 bulbs of 40W, 5 bulbs of 100W, 5 fans of 80W and 1 heater of 1kW are connected. The voltage of electric mains is 220V. The minimum capacity of the main fuse of the building will be (IIT-JEE 2014)	**9.** In a large building, there are 15 bulbs of 40W, 5 bulbs of 100W, 5 fans of 80W and 1 heater of 1kW are connected. The voltage of electric mains is 220V. The **maximum** capacity of the main fuse of the building will be (IIT-JEE 2014)
15	94	$R_2 = \frac{56}{15}\Omega$ (3)	$R_2 = \frac{56}{R_1}\Omega$ (3)
16	116	current exceeds a certain value. Lead and copper wire melts and burns out when	current exceeds a certain value. Lead, **Tin** and copper wire melts and burns out when

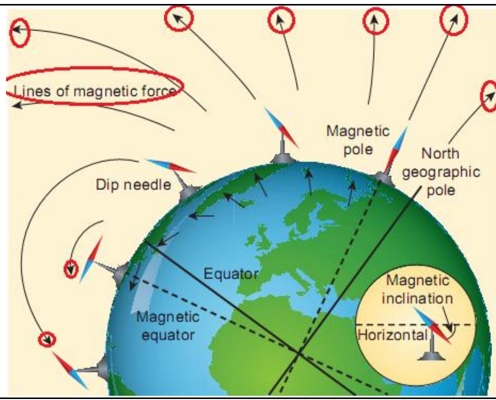
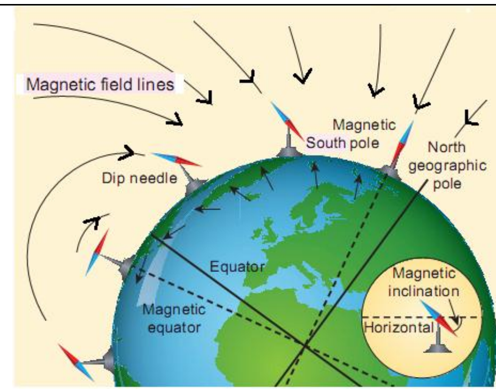
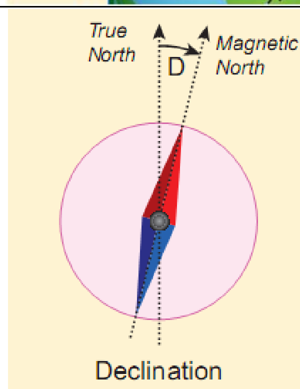
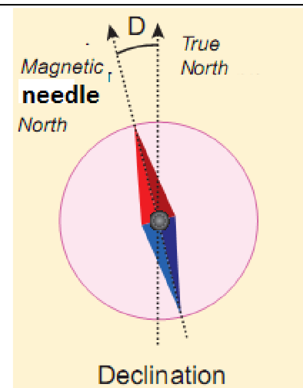
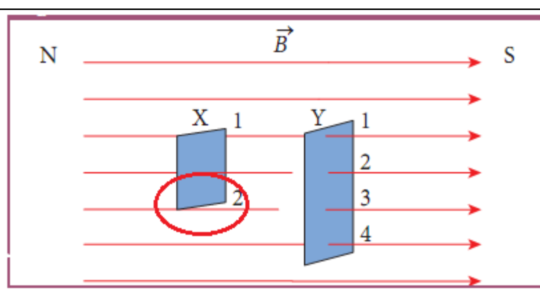
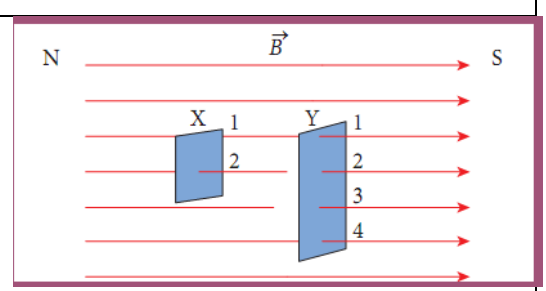
Unit 3(English medium)

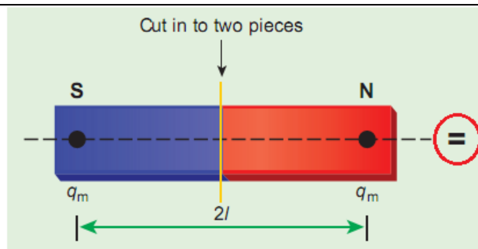
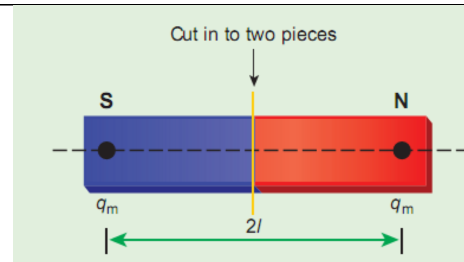
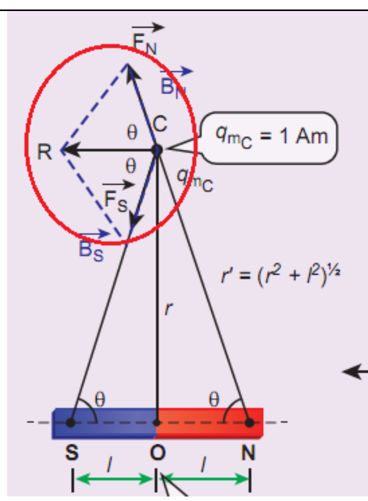
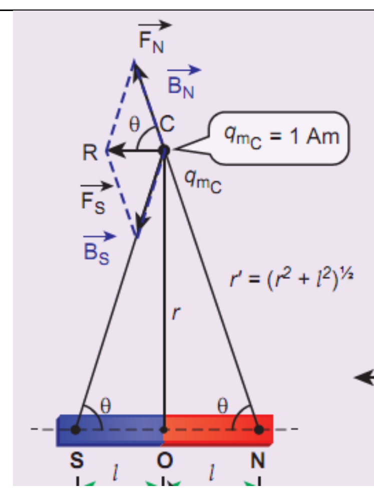
S.No	Page No	Error	Correction
1	128	• Magnetic induction at a point due to axial line and	Magnetic field

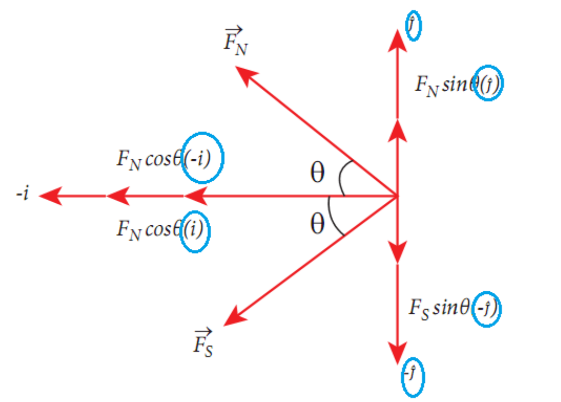
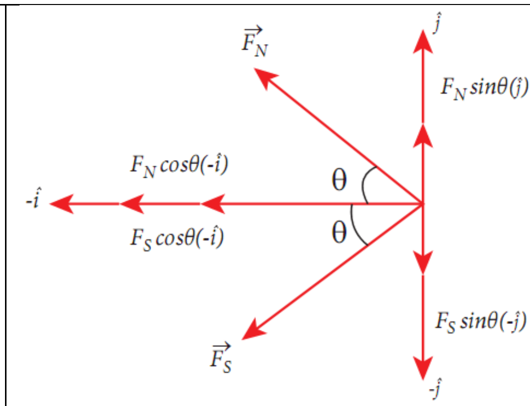
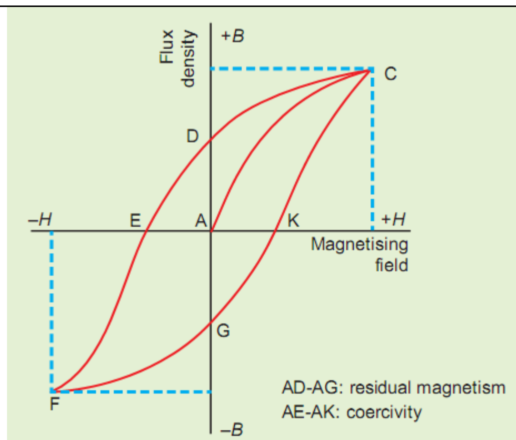
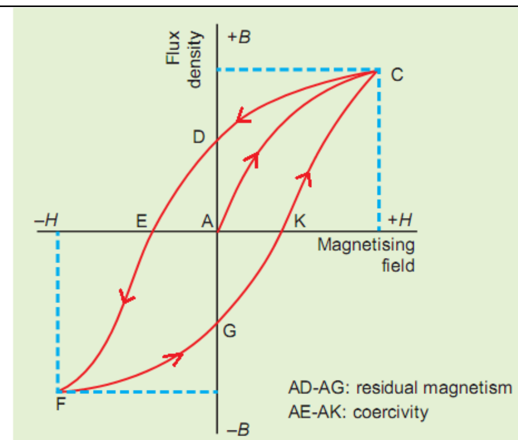
<table>
<tr><td>2</td><td>130</td><td>geographic north pole (Figure 3.3). Similarly, the south pole of magnetic compass needle is attracted towards the geographic north pole of the Earth which is near magnetic north-pole. The branch of physics which deals</td><td>geographic north pole (Figure 3.3). Similarly, the south pole of magnetic compass needle is attracted towards the geographic south pole of the Earth which is near magnetic north-pole. The branch of physics which deals</td></tr>
<tr><td>3</td><td>130</td><td>


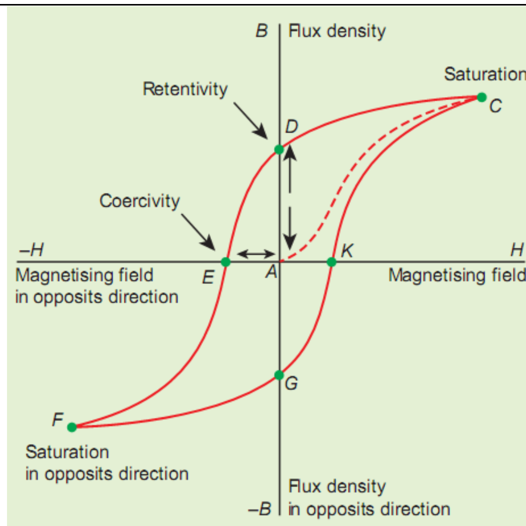
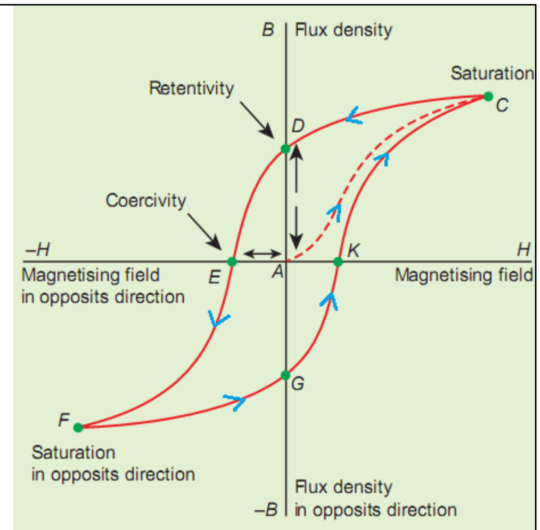
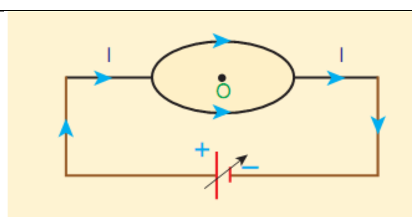
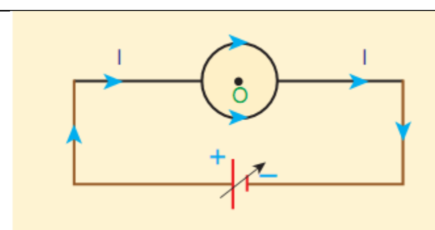
| Figure 3.3 Earth's magnetic field</td><td>


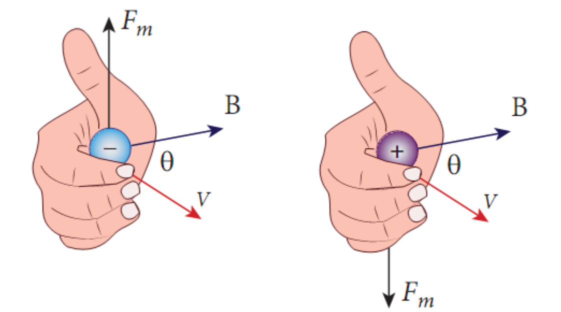
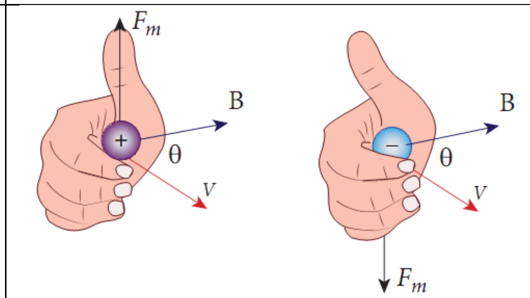
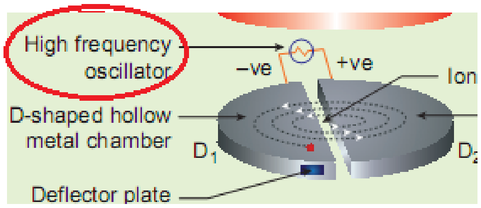
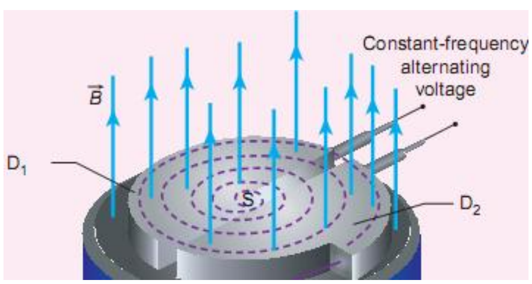
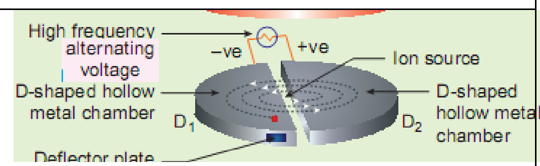
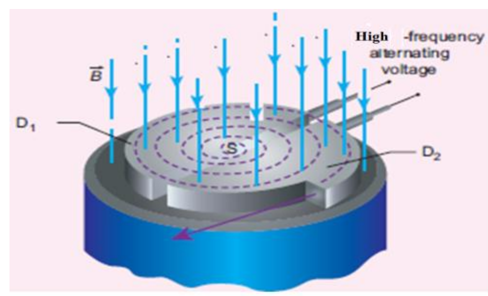
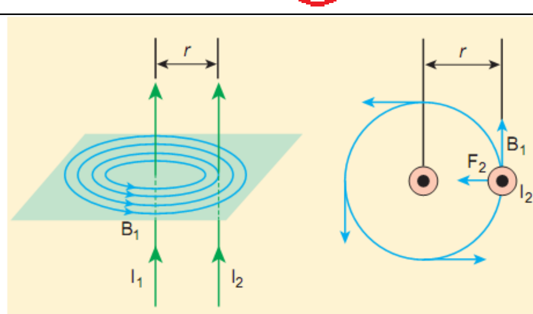
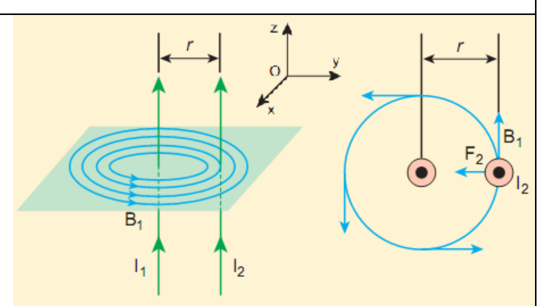
| Figure 3.3 Earth's magnetic field</td></tr>
<tr><td>4</td><td>130</td><td>

</td><td>

</td></tr>
<tr><td>5</td><td>130</td><td>

</td><td>

</td></tr>
</table>

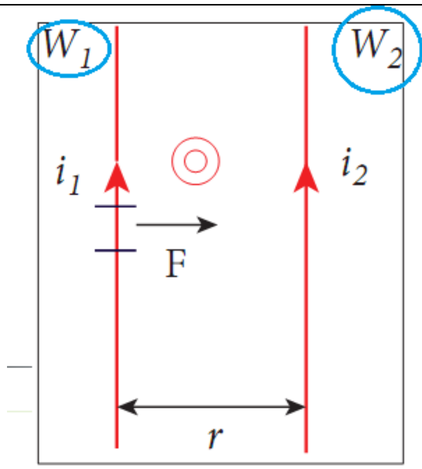
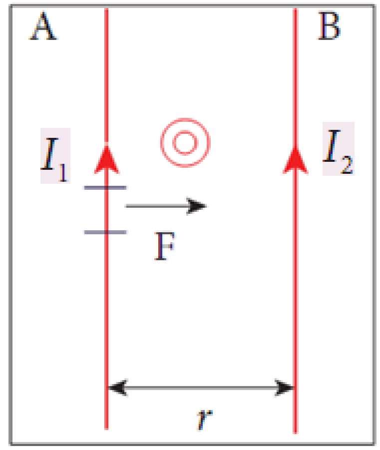
<table>
<tr><td>6</td><td>131</td><td>
</td><td>
</td></tr>
<tr><td>7</td><td>131</td><td>
</td><td>
</td></tr>
<tr><td>8</td><td>132</td><td>Calculate the angle of dip and resultant magnetic field.
Solution:
$B_H = 0.15$ G and $B_V = 0.26$ G</td><td>Calculate the angle of dip and resultant magnetic field.
(G -Gauss, cgs unit for magnetic field, 1 G =10^{-4} T)
Solution:
$B_H = 0.15$ G and $B_V = 0.26$ G</td></tr>
<tr><td>9</td><td>136</td><td>(d) Magnetic flux
The number of magnetic field lines crossing per unit area is called magnetic flux Φ_B. Mathematically, the magnetic flux</td><td>(d) Magnetic flux
The number of magnetic field lines crossing a given area is defined as magnetic flux Φ_B. Mathematically, the magnetic flux</td></tr>
<tr><td>10</td><td>138</td><td>
</td><td>
</td></tr>
</table>

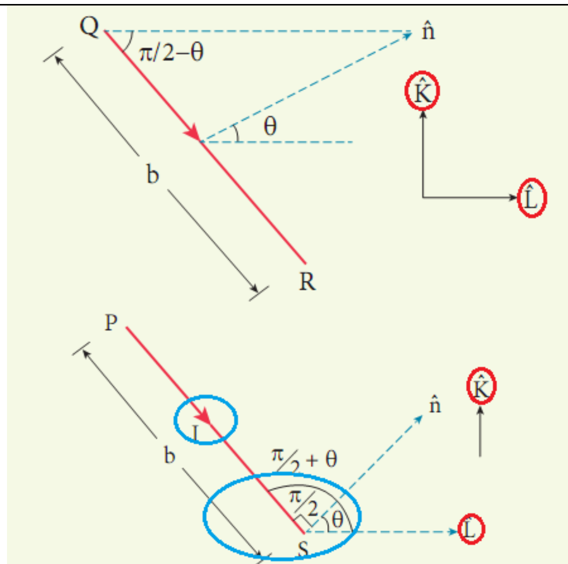
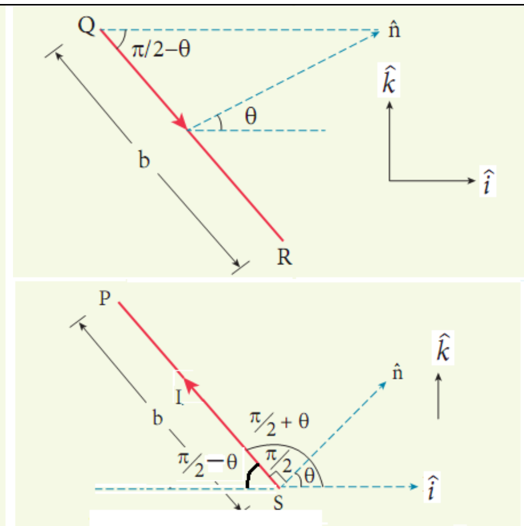
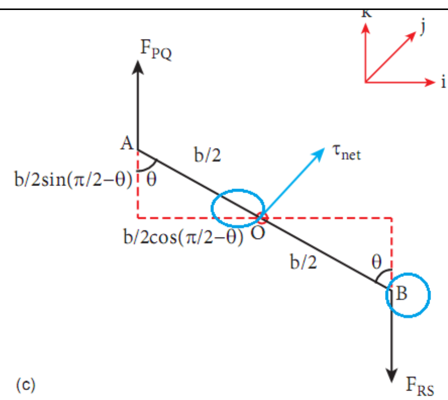
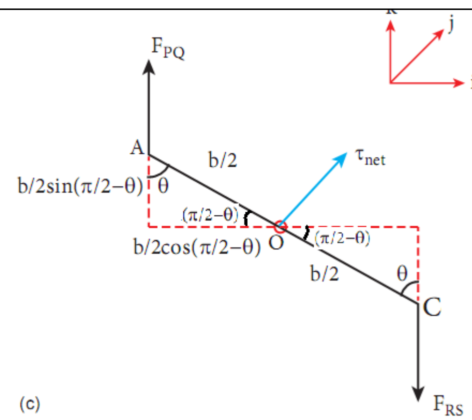
11	135	 	
12	136	2. The direction of magnetic field at any point on the curve is known by drawing tangent to the magnetic line of force at	Magnetic field lines
13	138	**Note** Here the integral is taken over area. Let X and Y be two planar strips whose orientation is such that the direction of area vector of planar strips is parallel to the direction of the magnetic	**Note** Let X and Y be two planar strips whose orientation is such that the direction of area vector of planar strips is
14	139	**Figure 3.15** Coulomb's law – force between two magnetic pole strength	**Figure 3.15** Coulomb's law – force between two magnetic pole
15	140	$\vec{F} \propto \frac{q_{m_A} q_{m_B}}{r^2} \hat{r}$ where m_A and m_B	$\vec{F} \propto \frac{q_{m_A} q_{m_B}}{r^2} \hat{r}$ where q_{m_A} and q_{m_B}
16	140	$(q_{mc} = 1 \text{ A m})$	$(q_{m_C} = 1 \text{ A m})$
17	142	 	

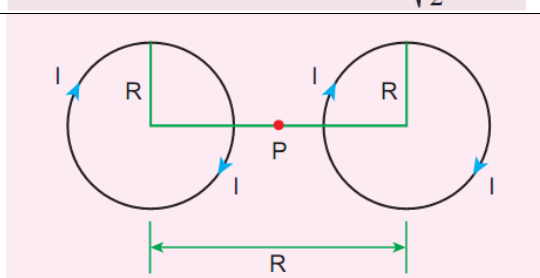
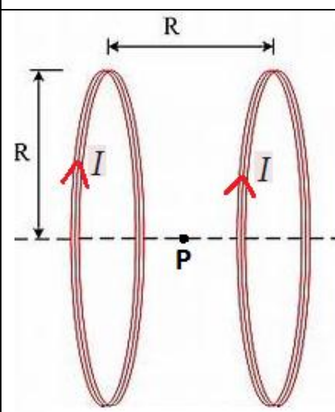
18	142		
19	144	$T = 2\pi\sqrt{\frac{1}{p_m B}}$ in second,	$T = 2\pi\sqrt{\frac{I}{p_m B}}$ in second,
20	150	$\vec{B} = \vec{B}_o + \vec{B}_m = \mu_o\vec{H} + \mu_o\vec{I}$ $\Rightarrow \vec{B} = \vec{B}_o + \vec{B}_m = \mu_o(\vec{H} + \vec{I})$ (3.35)	$\vec{B} = \vec{B}_o + \vec{B}_m = \mu_o\vec{H} + \mu_o\vec{M}$ $\Rightarrow \vec{B} = \vec{B}_o + \vec{B}_m = \mu_o(\vec{H} + \vec{M})$ (3.35)
21	151	$I = \frac{Magnetic\,moment}{Volume} = \frac{2}{25\times10^{-6}}$	$M = \frac{Magnetic\,moment}{Volume} = \frac{2}{25\times10^{-6}}$
22	157	 Hysteresis loop for magnetic material	 Hysteresis loop for magnetic material

			
23	163	is maximum and is given by $d\vec{B} = \frac{I\,dl}{r^2}\hat{n}$	is maximum and is given by $d\vec{B} = \frac{\mu_0}{4\pi}\frac{I\,dl}{r^2}\hat{n}$
24	165	$\cos\varphi_1 = \frac{\frac{y}{2}}{\sqrt{\frac{y^2}{4}+a^2}} = \frac{adjacent\,length}{hypotenuse\,length}$ $= \frac{ON}{PN} = -\frac{\frac{y}{2}}{\sqrt{\frac{y^2}{4}+a^2}} = -\frac{y}{\sqrt{y^2+4a^2}}$	$\cos\varphi_1 = \frac{adjacent\,length}{hypotenuse\,length} = \frac{ON}{PN}$ $= \frac{\frac{y}{2}}{\sqrt{\frac{y^2}{4}+a^2}} = \frac{y}{\sqrt{y^2+4a^2}}$
25	166	$PC = PD = r = \sqrt{R^2 + Z^2}$	$PC = PD = r = \sqrt{R^2 + z^2}$
26	167		
27	167	***Solution*** The magnetic field due to current in the upper hemisphere and lower hemisphere	Semicircle
28	169	Note Line integral means integral over a line or curve, symbol used is $\int$.	Note Line integral means integral over a line or curve, symbol used is $\int_c$

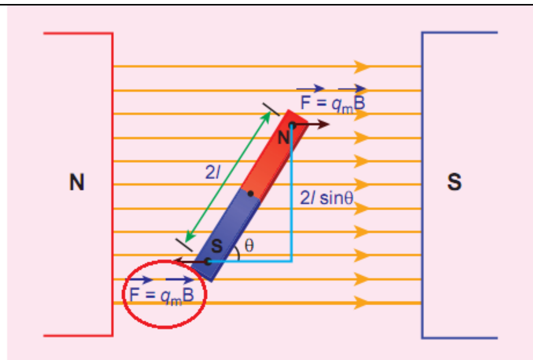
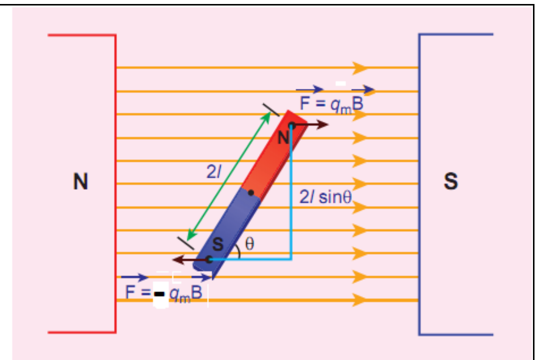
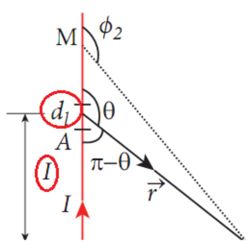
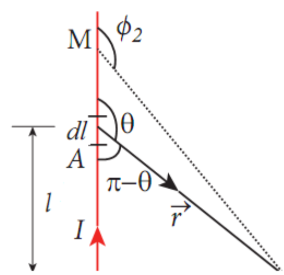
29	175	$\vec{F} = q\vec{E}(\vec{v}\times\vec{B})$. It is known as Lorentz force.	$\vec{F} = q(\vec{E}+\vec{v}\times\vec{B})$
30	175		
31	182	 	 In the above picture, change the anticlockwise motion of charge into clock wise motion. 
32	183	When a current carrying conductor	When a current carrying conducting wire
33	184	wire is $I\,d\vec{l} = -enA\vec{v}_d dl$ Therefore the force	wire is $I\,d\vec{l} = -enA\vec{v}_d dl$. Therefore the force
34	185	towards the wire W_1.	towards the wire A
35	185	 **Figure 3.58** Two long straight parallel wires	 **Figure 3.58** Two long straight parallel wires

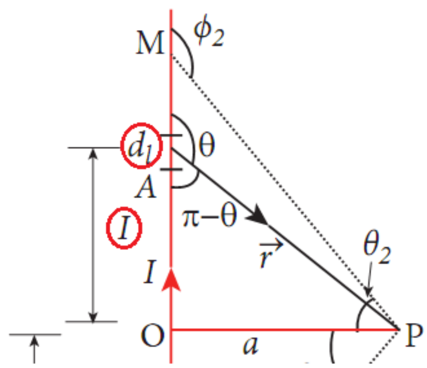
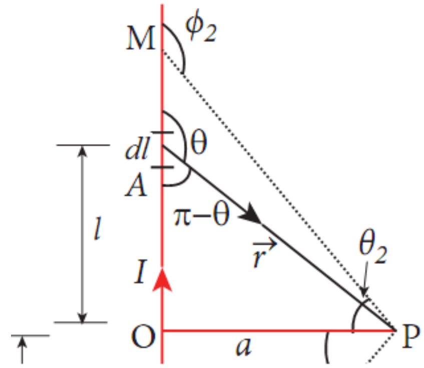
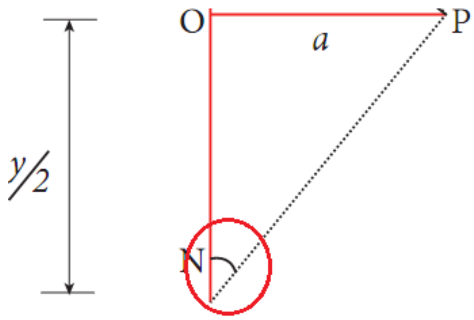
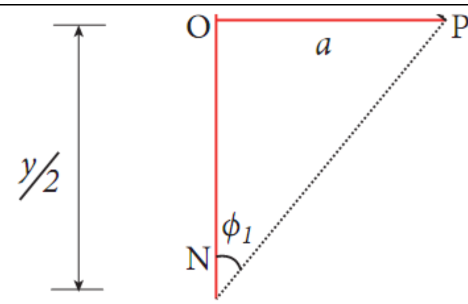
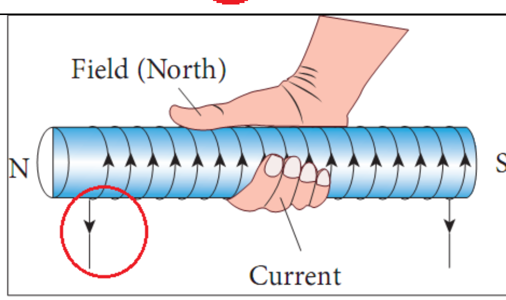
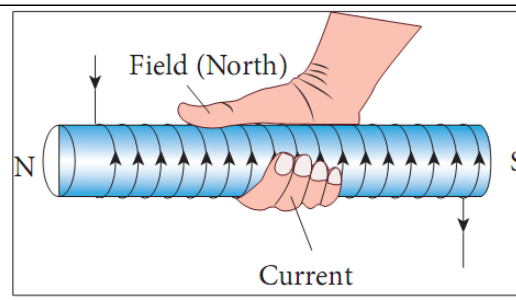
36	186	Hence, the magnetic the wire is W_1 is	Hence, the magnetic the wire is A is
37	186		
38	186	$\frac{\vec{F}}{l} = -\frac{\mu_\circ I_1 I_2}{2\pi r}\hat{j}$	$\frac{\vec{F}}{l} = \frac{\mu_\circ I_1 I_2}{2\pi r}\hat{j}$
39	188	When the loop starts rotating due to this torque, the magnetic field $\vec{B}$ is no longer in the plane of the loop. So the above equation is the special case. When the loop starts rotating about z axis due to this torque, the magnetic field $\vec{B}$ is no longer in the plane of the loop. So the above equation is the special case.	When the loop starts rotating about z axis due to this torque, the magnetic field $\vec{B}$ is no longer in the plane of the loop. So the above equation is the special case.
40	188	$\vec{l} = b\cos\left(\frac{\pi}{2}-\theta\right)\check{i} + \sin\left(\frac{\pi}{2}-\theta\right)\check{k}$ and $\vec{B} = B\check{i}$	$\vec{l} = b\cos\left(\frac{\pi}{2}-\theta\right)\hat{i} - b\sin\left(\frac{\pi}{2}-\theta\right)\hat{k}$ and $\vec{B} = B\hat{i}$

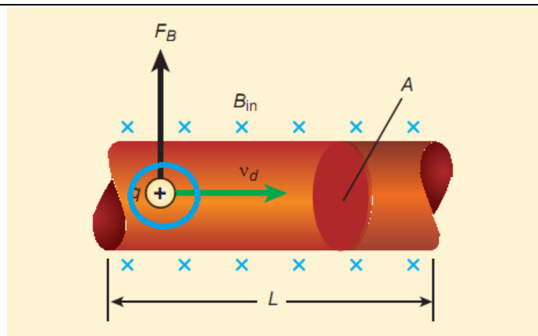
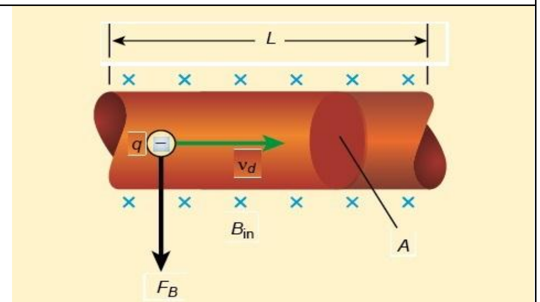
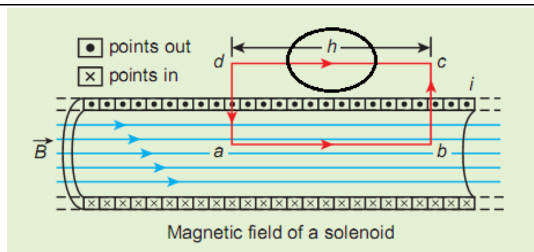
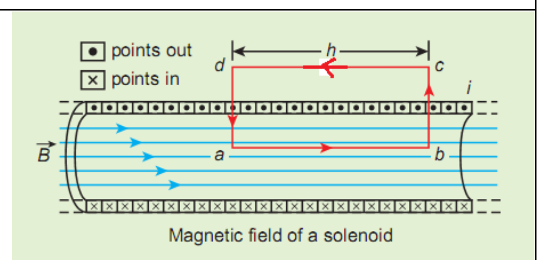
41	188	 Horizontal component of $\vec{PS}$=b cos$\left(\frac{\pi}{2}+\theta\right)$ Vertical component of $\vec{PS}$=b sin$\left(\frac{\pi}{2}+\theta\right)$	 $\vec{PS} = -b\cos\left(\frac{\pi}{2}-\theta\right)\hat{i} + b\sin\left(\frac{\pi}{2}-\theta\right)\hat{k}$ Horizontal component of $\vec{PS}$=−b cos$\left(\frac{\pi}{2}-\theta\right)$ Vertical component of $\vec{PS}$=b sin$\left(\frac{\pi}{2}-\theta\right)$
42	188	(d) The force on section SP $\vec{l} = b\cos\left(\frac{\pi}{2}+\theta\right)\hat{i} + \sin\left(\frac{\pi}{2}+\theta\right)\hat{k}$ *and* $\vec{B} = B\hat{i}$ $\vec{F}_{SP} = I\vec{l}\times\vec{B} = IbB\sin\left(\frac{\pi}{2}+\theta\right)\hat{j}$	(d) The force on section SP $\vec{l} = -b\cos\left(\frac{\pi}{2}-\theta\right)\hat{i} + b\sin\left(\frac{\pi}{2}-\theta\right)\hat{k}$ *and* $\vec{B} = B\hat{i}$ $\vec{F}_{SP} = I\vec{l}\times\vec{B} = IbB\sin\left(\frac{\pi}{2}-\theta\right)\hat{j}$
43	189	 **Figure 3.65** Force on the rectangular	 **Figure 3.65** Force on the rectangular
44	189	$\vec{\tau}_{net} = baBI\sin\theta\,\hat{k} = ABI\sin\theta\,\hat{k}$	$\vec{\tau}_{net} = baBI\sin\theta\,\hat{j} = IabB\sin\theta\,\hat{j}$

45	189	$\overline{OA} = \frac{b}{2}\cos\left(\frac{\pi}{2}-\theta\right)(-\hat{i}) + \frac{b}{2}\sin\left(\frac{\pi}{2}-\theta\right)(-\hat{k})$ $= \frac{b}{2}(-\sin\theta\,\hat{i} + \cos\theta\,\hat{k})$ $\overline{OB} = \frac{b}{2}\cos\left(\frac{\pi}{2}-\theta\right)(\hat{i}) + \frac{b}{2}\sin\left(\frac{\pi}{2}-\theta\right)(-\hat{k})$ $= \frac{b}{2}(-\sin\theta\,\hat{i} + \cos\theta\,\hat{k})$ $\overline{OA}\times\vec{F}_{PQ} = \left\{\frac{b}{2}(-\sin\theta\,\hat{i} + \cos\theta\,\hat{k})\right\}\times\{IaB\,\hat{k}\}$ $= \frac{1}{2}IabB\sin\theta\,\hat{j}$ $\overline{OB}\times\vec{F}_{RS} = \left\{\frac{b}{2}(\sin\theta\,\hat{i} + \cos\theta\,\hat{k})\right\}\times\{-IaB\,\hat{k}\}$ $= \frac{1}{2}IabB\sin\theta\,\hat{j}$	$\overline{OA} = \frac{b}{2}\cos\left(\frac{\pi}{2}-\theta\right)(-\hat{i}) + \frac{b}{2}\sin\left(\frac{\pi}{2}-\theta\right)(\hat{k})$ $= \frac{b}{2}(-\sin\theta\,\hat{i} + \cos\theta\,\hat{k})$ $\overline{OC} = \frac{b}{2}\cos\left(\frac{\pi}{2}-\theta\right)(\hat{i}) + \frac{b}{2}\sin\left(\frac{\pi}{2}-\theta\right)(-\hat{k})$ $= \frac{b}{2}(\sin\theta\,\hat{i} - \cos\theta\,\hat{k})$ $\overline{OA}\times\vec{F}_{PQ} = \left\{\frac{b}{2}(-\sin\theta\,\hat{i} + \cos\theta\,\hat{k})\right\}\times\{IaB\,\hat{k}\}$ $= \frac{1}{2}IabB\sin\theta\,\hat{j}$ $\overline{OC}\times\vec{F}_{RS} = \left\{\frac{b}{2}(\sin\theta\,\hat{i} - \cos\theta\,\hat{k})\right\}\times\{-IaB\,\hat{k}\}$ $= \frac{1}{2}IabB\sin\theta\,\hat{j}$
46	191	a fine suspension strip W, a small plane mirror is attached in order to measure the deflection of the coil with the help of lamp and scale arrangement. The other end of the mirror is connected to a torsion head T. In order to pass electric current through the galvanometer, the suspension strip W and	a fine suspension strip, a small plane mirror is attached in order to measure the deflection of the coil with the help of lamp and scale arrangement. The other end of the mirror is connected to a torsion head. In order to pass electric current through the galvanometer, the suspension strip and
47	195	in Figure 3.74. The scale is now calibrated	Figure 3.70
48	200	(a) $\sqrt{\frac{2}{\sqrt{3}}}\beta Il$ (b) $\sqrt{\frac{1}{\sqrt{3}}}\beta Il$ (c) $\sqrt{2}\beta Il$ (d) $\sqrt{\frac{1}{2}}\beta Il$	(a) $\sqrt{\frac{2}{3}}\beta Il$ (b) $\sqrt{\frac{1}{3}}\beta Il$ (c) $\sqrt{2}\beta Il$ (d) $\sqrt{\frac{1}{2}}\beta Il$
49	200		

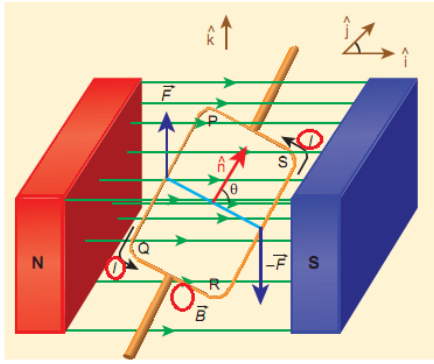
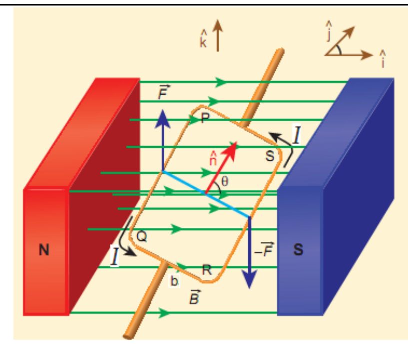
50	201	**15.** A simple pendulum with charged bob is oscillating with time period T and let θ be the angular displacement. If the uniform magnetic field is switched ON in a direction perpendicular to the plane of oscillation then (a) time period will decrease but θ will remain constant (b) time period remain constant but θ will decrease (c) both T and θ will remain the same (d) both T and θ will decrease	15.The potential energy of the magnetic dipole whose dipole moment is $\vec{p}_m = (-0.5\,\hat{\imath} + 0.4\,\hat{\jmath})\ A\ m^2$ kept in uniform magnetic field $\vec{B} = 0.2\,\hat{\imath}\ T$ is (a) $-0.1\,J$ (b) $-0.8\,J$ (c) $0.1\,J$ (d) $0.8\,J$
51	202	**2.** Deduce the relation for the magnetic induction at a point due to an infinitely	Magnetic field
52	202	**3.** Obtain a relation for the magnetic induction at a point along the axis of a **5.** Calculate the magnetic induction at a **6.** Obtain the magnetic induction at a **7.** Find the magnetic induction due to a	Magnetic field
53	202	**1.** A bar magnet having a magnetic moment $\vec{M}$ is cut into four pieces i.e., first cut in two pieces along the axis of the magnet and each piece is further cut into two pieces. Compute the magnetic moment of each piece. Answer $\vec{M}_{new} = \frac{1}{4}\vec{M}$	**1.** A bar magnet having a magnetic moment $\vec{p}_m$ is cut into four pieces i.e., first cut in two pieces along the axis of the magnet and each piece is further cut into two pieces. Compute the magnetic moment of each piece. Answer $\vec{p}_{m_{new}} = \frac{1}{4}\vec{p}_m$
54	165	$\cos\varphi_2 = \frac{adjacent\ length}{hypotenuse\ length} = \frac{OM}{PM}$	$\cos(\pi - \varphi_2) = \frac{adjacent\ length}{hypotenuse\ length} = \frac{OM}{PM}$ $\cos\varphi_2 = -\frac{OM}{PM}$
55	167	$\vec{B} = \frac{\mu_\circ I}{2\pi}\frac{R^2}{(R^2+Z^2)^{\frac{3}{2}}}\hat{k}$ (3.40)	$\vec{B} = \frac{\mu_\circ I}{2}\frac{R^2}{(R^2+Z^2)^{\frac{3}{2}}}\hat{k}$ (3.40)
56	166	$angle\ \angle CPO = \angle DPO = \theta$	$angle\ \angle CPO = \angle DPO = 90° - \theta$

57	144	 **Figure 3.19** Magnetic dipole kept in a uniform magnetic field	 **Figure 3.19** Magnetic dipole kept in a uniform magnetic field
58	145	$W=\int_{\theta'}^{\theta}\tau d\theta=\int_{\theta'}^{\theta}p_m B\sin\theta d\theta=p_m B\left[-\cos\theta d\theta\right]_{\theta'}^{\theta}$	$W=\int_{\theta'}^{\theta}\tau d\theta=\int_{\theta'}^{\theta}p_m B\sin\theta d\theta=p_m B\left[-\cos\theta\right]_{\theta'}^{\theta}$
59	181	$\frac{1}{2}mv^2=eV\Rightarrow v=\sqrt{\frac{eV}{2m}}$	$\frac{1}{2}mv^2=eV\Rightarrow v=\sqrt{\frac{2eV}{m}}$
60	164	$d\vec{B}=\frac{\mu_\circ I}{4\pi}\frac{d\vec{l}}{r^2}\sin\theta \left(\begin{matrix} unit\,vector \\ to\,d\vec{l} \end{matrix} \right.$	$d\vec{B}=\frac{\mu_\circ I}{4\pi}\frac{dl}{r^2}\sin\theta \left(\begin{matrix} unit\,vector \\ to\,d\vec{l} \end{matrix} \right.$
61	165	**EXAMPLE 3.15** Calculate the magnetic field at a point P which is perpendicular bisector to current carrying straight wire as shown in figure. 	**EXAMPLE 3.15** Calculate the magnetic field at a point P which is perpendicular bisector to current carrying straight wire as shown in figure. 

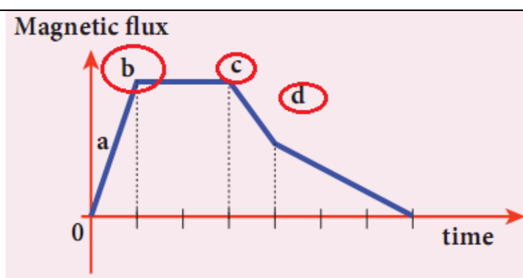
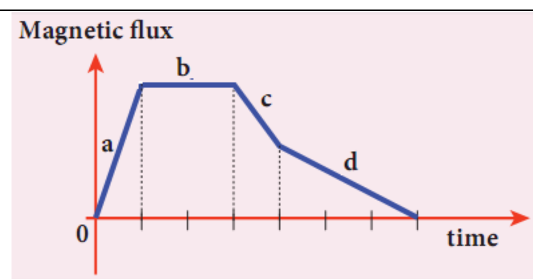
62	165	**EXAMPLE 3.16** 	**EXAMPLE 3.16** 
63	165		
64	170	Given that 1 = 1 A	Given that I = 1 A
65	171	**Figure 3.44** The direction of magnetic field of solenoid	**Figure 3.44** The direction of magnetic field of solenoid
66	178	**EXAMPLE 3.22** An electron moving perpendicular to a uniform magnetic field 0.500 T undergoes circular motion of radius 2.80 mm. What is the speed of electron?	**EXAMPLE 3.22** An electron moving perpendicular to a uniform magnetic field 0.500 T undergoes circular motion of radius 2.50 mm. What is the speed of electron?
67	179	The radius of the path of ${}^{238}_{92}U$ is r_{238} then $r_{238} = \frac{m_{238}v}{\lvert q\rvert B} = \frac{3.90\times10^{-25}\times1.00\times10^{5}}{1.6\times10^{-19}\times0.500}$	The radius of the path of ${}^{238}_{92}U$ is r_{238} then $r_{238} = \frac{m_{238}v}{\lvert q\rvert B} = \frac{3.95\times10^{-25}\times1.00\times10^{5}}{1.6\times10^{-19}\times0.500}$

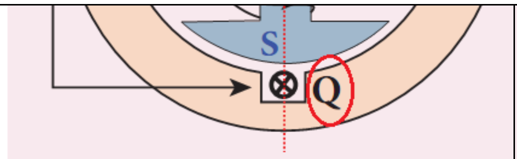
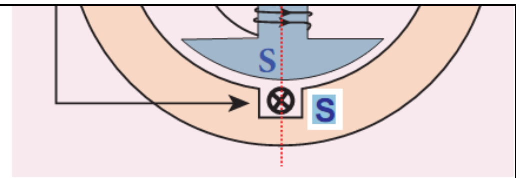
68	183	$I = neAvd$ (3.64)	$I = neAv_d$ (3.64)
69	183		
70	185	$d\vec{F} = \left(I_2 d\vec{l} \times \vec{B}_1\right) = -I_2 dl \frac{\mu_0 I_1}{2\pi r}(\hat{k} \times \hat{i})$	$\vec{F} = \left(I_2 d\vec{l} \times \vec{B}_1\right) = -I_2 dl \frac{\mu_0 I_1}{2\pi r}(\hat{k} \times \hat{i})$
71	170	$\vec{B}\, 2\pi r = \mu_0 I$	$B \cdot 2\pi r = \mu_0 I$
72	171	 **Figure 3.46 Amperian loop for solenoid**	 **Figure 3.46 Amperian loop for solenoid**
73	174	$\oint_{loop2} \vec{B}_S.\vec{dl} = \oint_{loop2} B dl \cos\theta = B 2\pi r_2$	$\oint_{loop2} \vec{B}_S.\vec{dl} = \oint_{loop2} B_S dl \cos\theta = B_S 2\pi r_2$
74	191	the sides QR and SP are always parallel to to the B-field (magnetic field) and experience no force. The sides PQ and RS are always parallel to the B-field and experience force	the sides QR and SP are always parallel to the B-field (magnetic field) and experience no force. The sides PQ and RS are always perpendicular to the B-field and experience force
75	201	11) b 12) c 13) b 14) d	11) c 12) c 13) b 14) d
76	194	Since, the shunt resistance is a very low resistance and the ratio $\frac{S}{R_g}$ is also small. This means, R_g is also small, i.e., the resistance	Since, the shunt resistance is a very low resistance and the ratio $\frac{S}{R_g}$ is also small. This means, R_a is also small, i.e., the resistance

77	185	In the same manner, we compute the magnitude of net magnetic induction due to current $I_{\circ}$ (in conductor A) at a distance r in	In the same manner, we compute the net magnetic induction due to current I (in conductor A) at a distance r in
78	184	Hence Lorentz force on the wire of length dl is the product of the number of the electrons (N = nA dl) and the force acting on an electron.	Hence Lorentz force on the wire of length dl is the product of the number of the electrons (N = nA dl) and the force acting on **each** electron.
79	175	7. The direction of $\vec{F}_m$ on negative charge is opposite to the direction of $\vec{F}_m$ on positive charge provided other factors are identical as shown Figure 3.49 8. If velocity $\vec{v}$ of the charge q is along magnetic field $\vec{B}$ then, $\vec{F}_m$ is zero	**6**. The direction of $\vec{F}_m$ on negative charge is opposite to the direction of $\vec{F}_m$ on positive charge provided other factors are identical as shown Figure 3.49 7. If velocity $\vec{v}$ of the charge q is along magnetic field $\vec{B}$ then, $\vec{F}_m$ is zero
80	194	to zero. Hence the reading in ammeter is always lesser than the actual current in the	to zero. **But in reality**, the reading in ammeter is always lesser than the actual current in the
81	194	$\frac{\Delta I}{I} \times 100\% = \frac{I_{ideal} - I_{actual}}{I_{actual}} \times 100\%$	$\frac{\Delta I}{I} \times 100\% = \frac{I_{ideal} - I_{actual}}{I_{ideal}} \times 100\%$
82	190	$\vec{\tau}_{net} = \vec{p} \times \vec{E}$ which is given in the Unit 1. (Section 1.4.3)	$\vec{\tau}_{net} = \vec{p} \times \vec{E}$ which is given in the Unit 1. (Section 1.4.3) **and also in unit 3(section 3.3)** $\vec{\tau}_{net} = \vec{p}_m \times \vec{B}$
83	164	$dl = a\,\mathrm{cosec}^2\theta\, d\theta$ $d\vec{B} = \frac{\mu_\circ I}{4\pi}\frac{(a\,\mathrm{cosec}^2\theta\ d\theta)}{(a\,\mathrm{cosec}\theta)^2}\sin\theta\, d\theta\, \hat{n}$ $d\vec{B} = \frac{\mu_\circ I}{4\pi}\frac{(a\,\mathrm{cosec}^2\theta\ d\theta)}{a^2\,\mathrm{cosec}^2\theta}\sin\theta\, d\theta\, \hat{n}$ $= \frac{\mu_\circ I}{4\pi a}\sin\theta\, d\theta\, \hat{n}$	$dl = a\,\mathrm{cosec}^2\theta\, d\theta$ $d\vec{B} = \frac{\mu_\circ I}{4\pi}\frac{(a\,\mathrm{cosec}^2\theta\ d\theta)}{(a\,\mathrm{cosec}\theta)^2}\sin\theta\, \hat{n}$ $d\vec{B} = \frac{\mu_\circ I}{4\pi}\frac{(a\,\mathrm{cosec}^2\theta\ d\theta)}{a^2\,\mathrm{cosec}^2\theta}\sin\theta\, \hat{n}$ $= \frac{\mu_\circ I}{4\pi a}\sin\theta\, d\theta\, \hat{n}$
84	165	Hence, $\vec{B} = \frac{\mu_\circ I}{4\pi a}\frac{2y}{\sqrt{y^2 + 4a^2}}\hat{n}$	**Using the equation** $\vec{B} = \frac{\mu_\circ I}{4\pi a}(\cos\varphi_1 - \cos\varphi_2)\hat{n}$ **We get** $\vec{B} = \frac{\mu_\circ I}{4\pi a}\frac{2y}{\sqrt{y^2 + 4a^2}}\hat{n}$

85	187	 Figure 3.63 Unit vector makes an angle θ with the field	 Figure 3.63 Unit vector makes an angle θ with the field

Unit 4(English medium)

S.No	P.No	Error	Correction
1	264	$= V_m I_m \sin\omega t[\sin\omega t\cos\phi - \cos\omega t\sin\phi]$ $P = V_m I_m[\cos\phi\sin^2\omega t - \sin\omega t\cos\omega t\sin\phi]$ (4.61)	$= V_m I_m \sin\omega t[\sin\omega t\cos\phi + \cos\omega t\sin\phi]$ $P = V_m I_m[\cos\phi\sin^2\omega t + \sin\omega t\cos\omega t\sin\phi]$ (4.61)
2	279	is 0.04 m. Find the magnetic flux of a turn when it carries a current of 1 A. (Ans: 1.26 Wb)	is 0.04 m. Find the magnetic flux of a turn when it carries a current of 1 A. (Ans: 0.63×10^{-4} Wb)
3	280	in 0.04 second. Calculate the induced emf in solenoid 2. (Ans: 1.81H; 271.5 V)	in 0.04 second. Calculate the induced emf in solenoid 2. (Ans: 1.81H; −271.5 V)
4	280		

5	240	 **Figure 4.32** Stator core with a rectangular loop and 2-pole rotor	 **Figure 4.32** Stator core with a rectangular loop and 2-pole rotor

Unit 5(English medium)

S.No	P.No	Error	correction
1	285	$\oint_l \vec{B}\cdot d\vec{l} = -\frac{\partial}{\partial t}\Phi_E = -\frac{\partial}{\partial t}\oint_S \vec{B}\cdot d\vec{S}$ (5.2) $\underbrace{\oint_l \vec{E}\cdot d\vec{l}} = \underbrace{-\frac{\partial}{\partial t}\Phi_E} = \underbrace{-\frac{\partial}{\partial t}\oint_S \vec{B}\cdot d\vec{S}}$	$\oint_l \vec{B}\cdot d\vec{l} = -\frac{\partial}{\partial t}\Phi_E = -\frac{\partial}{\partial t}\oint_S \vec{E}\cdot d\vec{A}$ (5.2) $\underbrace{\oint_l \vec{B}\cdot d\vec{l}} = \underbrace{-\frac{\partial}{\partial t}\Phi_E} = \underbrace{-\frac{\partial}{\partial t}\oint_S \vec{E}\cdot d\vec{A}}$
2	285	$\oint_{S_1} \vec{B}\cdot d\vec{l} = \mu_0 I_C$ (5.4)	$\oint_l \vec{B}\cdot d\vec{l} = \mu_o I(t)$ (5.3)
3	285	the net current I threading through the	Passing
4	286	$\Phi_E = \oiint \vec{E}\cdot d\vec{A} = EA = \frac{q}{\varepsilon_0}$	$\Phi_E = \oint_s \vec{E}\cdot d\vec{A} = EA = \frac{q}{\varepsilon_0}$
5	286	$\oint \vec{B}\cdot d\vec{S} = \mu_o I = \mu_o(I_C + I_d)$ (5.6)	$\oint \vec{B}.d\vec{l} = \mu_o I = \mu_o(I_C + I_d)$ (5.6)
6	292	Hz. It obeys reflection and polarization.	Hz. It **shows** reflection and polarization.
7	293	give the wavelength of microwave.	give the **half** wavelength of microwave.
8	297	▪ Maxwell modified Ampere's law as $\oint \vec{B}\cdot d\vec{S} = \mu_o I = \mu_o(I_c + I_d)$	▪ Maxwell modified Ampere's law as $\oint \vec{B}.d\vec{l} = \mu_o I = \mu_o(I_C + I_d)$

9	299	(b) $\oint \vec{E}\cdot d\vec{A}=0$ (c) $\oint \vec{E}\cdot d\vec{A}=\mu_\circ I_{enclosed}+\mu_\circ \in_\circ \frac{d}{dt}\int \vec{E}\cdot d\vec{A}$	(b) $\oint \vec{B}\cdot d\vec{A}=0$ (c) $\oint \vec{B}.\vec{dl}=\mu_0 I_{enclosed}+\mu_0\varepsilon_0 \frac{d}{dt}\int_s \vec{E}.d\vec{A}$
10	300	$E = E_o \sin[10^6 x - \omega t]$	$E = E_o \sin[10^6 x - \omega t]$
11	301	Answer: 18.84×10^{-6} m	Answer: 18.84×10^{2} m
12	301	Answer: $\lambda = 3 \times 10^{-18}$ m and $\vec{E}(x,t)=3\times10^3 \sin\left(2.09\times10^{18}x-6.28\times10^{10}t\right)\hat{i}\ NC^{-1}$	Answer: $\lambda = 3 \times 10^{-2}$ m and $\vec{E}(x,t)=3\times10^3 \sin\left(2.09\times10^{2}x-6.28\times10^{10}t\right)\hat{i}\ NC^{-1}$
13	301	Answer: $v = 2\ m\ s^{-1}$	Answer: $v = 2 \times 10^{18} m\ s^{-1}$
14	299	**4.** Which of the following are false for electromagnetic waves (a) transverse (b) mechanical waves (c) longitudinal (d) produced by accelerating cha	**4.** Which of the following are false for electromagnetic waves (a) transverse (b) non- mechanical waves (c) longitudinal (d) produced by accelerating cha