Q1 $R = 1500$ AT/Wb $\quad N = 200$

$I = 3A, \quad V = 24$

$\phi = ?$

$R = \frac{NI}{\phi} \quad \phi = 0.4 wb$

(a) $[V = IR]$

$R = \frac{V}{I} = \frac{24}{3} = 8\Omega$

Sol 2 $l = 1.3m, \quad a = 0.02 m^2, \quad n = 50$

$R = 0.82\Omega, \quad I = 2A, \quad R = 7425$

$\phi = \frac{NI}{R} = \frac{50 \times 2}{7425} = 0.013 wb$

$\left[B = \frac{\phi}{A}\right]$

$B = \frac{0.034}{0.024} = 0.56 wb/m^2$

$V = IR = 2 \times 0.082 = 1.64V$

$V = 1.64V$

Ans $l_{avg} = 1.4m, \quad a = 0.25 m^2$

$N = 140 t, \quad R = 30\Omega, \quad B = 1.5 T$

$R = 768$ AT

$B = \frac{0.0134}{0.024} = 0.56\,Wb/m^2$

$B = 0.56\,Wb/m^2$

$V = IR = 2 \times 0.82 = 1.64V$

b) $l_{avg} = 1.4m$, $a = 0.25m^2$

$N = 140t$, $R = 30\Omega$, $B = 1.5T$

$R = 30\Omega$, $B = 1.56T$

$R = 768\ A-t$

$[V = IR]$ $\quad \phi = B \cdot A$

$I = \frac{R\phi}{N}$

$= \frac{768 \times 1.56 \times 0.25}{1.40}$

$= 2.13$

$V = IR = 84.18$

$\boxed{V = 64.180}$

Ans) $a = 0.11m^2$, $l_{avg} = 1.4m$

$\mu = 1.2566 \times 10^{-3}\ Wb/H$

$[R = ?]$

$R = \frac{NI}{\phi} = \frac{N I_{\mu}}{B \cdot A \cdot l} = \left[\frac{l_{\mu}}{B \cdot A}\right]$

$\left[\mu = \frac{B}{H}\right]$ $\left[R = \frac{l}{\mu A}\right] = \left[\frac{1.4}{1.2566 \times 10^{-3} \times 0.11}\right]$

$[R = 10.55 \times 10^3\ A-t]$

Ans) $[l = 0.80m]$, $a = 0.06m^2$, $N = 340$, $R = 64\Omega$

$[\mu_{\mu} = 2.6T]$

$V = 50V$

$B = ?$ $\quad \left[B = \frac{\phi}{A}\right]$

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$I = \frac{56}{64} A$ $\quad \mu = \frac{B}{H} = \frac{BQ}{NI}$

$\mu_m = \frac{\mu}{\mu_0} = \mu = \mu_m \mu_0 H$

$\left[\mu_m \mu_0 = \frac{BQ}{NI}\right]$

$B = \frac{\mu_m \mu_0 N I}{Q}$

$= \frac{2167 \times 4\pi \times 10^{-7} \times 56 \times 340}{0.80 \times 64}$

$B = 1.0126 T$

$B = 1.013 T$

Ans 6

$\mu = 0.52$, $a = 0.0018 m^2$

$l = 0.14 m$ $\quad B = 1.2 T$

$R = 67\Omega$, $N = 1000$

$V = 2.$ $\quad V = IR$

$R = \frac{N \cdot \Phi}{I}$

$\Phi = AB = (1.3 \times 10^{-3} \times 1.2) = 2.16 \times$

Now $\mu_g = \mu_0 = \frac{B_g}{H_g} = \frac{B}{H_g}$

$H_g = 954929.66 A-t$

$H_p = 400 A-t/m$

$F_C = H_0 = 208 A-t$

$F_t = \gamma_y + I_C = 1545 A-t$

$I = \frac{F}{N} = \frac{1545}{100} = 15.45$

$V = IR =$ $\boxed{V = 988.5 V}$

Ans 10

$a = 0.14 m$ $\quad R_2 = 274 At/wb$ $\quad R = 5.25$

$R_1 = 650 At/m$ $\quad N_2 = 268$

$\boxed{R_{TH} = R_1 + R_2 = 894 At/wb}$

$\Phi = \frac{NI}{R} = \frac{268 \times 15}{5.2 \times 894}$

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b) $R_{mat} = \left[\frac{894 + 2l}{\mu A}\right] = 2 * \frac{0.0012}{4\pi \times 10^{-7} \times 0.14}$

$R_{mat} = 13.64 \times 10^3$ AT/Wb

$\phi = \frac{NI}{R}$ $\phi = 0.1086$

Ans 11 $f = 25$ Hz, $f = 60$ Hz, $n = 1.65$ $P = K_f f B_m = K B_m^{1.25}$

$P_n = K(60)(0.4)15\ 6_{max}^{1.25}$

$\frac{P_{n1} - P_R}{P_{n1}} \Big| = \left(\frac{25 - (60)(0.4)}{25}\right) \times 100$

$= 47.08\%$

% change $= 47.08\%$

Ans 12 $[P_n = 250 \alpha]$ $P_{n1} = K_n + B_{max} = 250$

$P_n = K_{max} \frac{60}{100} f \left(\frac{80}{100}\right)^{1.6} B_{max}^{1.6}$

$P_{n2} = \left(\frac{60}{100}\right)\left(\frac{80}{100}\right)^6 K_{mf} \cdot \frac{B_{max}^{1.6}}{250}$

$P_{n2} = 104.90$

Ans 13 $l = 0.32$, $R = 0.25\Omega$

$B = 1.3$ T

$F = 120$ mN

$F = IBl$

$[120 = V_R Bl]$

$V = \frac{120 \times 0.25}{13 \times 0.32}$

$V = 72.11$ V

b) $F = IBl \sin 25°$

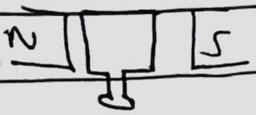
$= \frac{120 \times 0.15}{1.3 \times 0.32 \times 0.90}$

$V = 79.59$ V

Ans 14 $m = 30$, $R_{Solid} = 1.56\Omega$, $B = 1.34T$, $l = 0.54m$

$P = 84N m$

$\tau = 2Fd = 2IBld\cos\beta$



$F = IBl\cos(\beta)$

$I = 84 = 2\times1.34\times0.54\times0.99\times0.22$

Sol = $v = 30.64$, $B = 0.86$

$l = 0.54$ m/s

$e = vBl = 65.89$ m/s

Ans 16 $l = 1.2m$, $v = 5.2$ m/s, $[B = 0.18 A]$

$e = vBl$

$= 5.2\times0.18\times1.2$

$e = 1.1230$

Ans 17 Pole $\phi = 0.28$ wb/pole

$f = \frac{P.N}{2} = \frac{12\times4}{2} = 24Hz$

$f = 24Hz$

$E_{rms} = 4.44\times24\times3\times0.28$

$E = 89.52$

Ans 18 $E = 24V$, $N = 25$

$P = 2$, $\phi_{max} = 0.012$ wb/pole

$[E_{rms} = 4.44 N f \phi]$

$24 = 4.44\times25\times\frac{PN}{2}\times0.012$

$n = \frac{24}{4.44\times25\times2\times0.012}\times2$

$[n = 18\ 1116]$

AD20 $V = 120V$ & $f = 25\ Hz$

$P = K_e f^2 B^2_m$

$P_{e_1} = K_e B^2 (25)^2$

$P_{e_2} = K_e B^2_{max} (60)^2$

$\therefore$ change $= \frac{P_{e_2} - P_{e_1}}{P_{e_1}}$

$= \frac{(60)^2 - (25)^2}{(25)^2}$

$= \frac{3600 - 625}{625} = 476\ \%$

AD21 $P_e = 212.6W$

$P_{e_1} = K_e f^2 B^2_m$

$P_{e_2} = K_e \left(\frac{60}{100}\right)^2 f^2 \left(\frac{80}{100}\right)^2 B^2_m$

$= 212.6 \times (0.6)^2 \times (0.8)^2$

$P_{eu} = 48.9W$