Documento Personal de Identificación – DPI –

UNIVERSIDAD DE SAN CARLOS
FACULTAD DE INGENIERIA
DEPARTAMENTO DE FISICIA
CURSO DE VACACIONES DICIEMBRE 2023

Firma:

Carné : 201709088 Curso: Física 2 Sección: C

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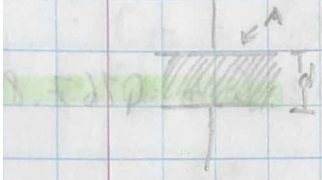
----------Puede iniciar su examen a partir de aquí ----------

Pregunta 1.



$A = 10.0\ cm^2 = 1 \times 10^{-3}\ m$

$d = 3\ mm = 3 \times 10^{-3}\ m$

$V = 10\ v.$

$U = 5 \times 10^{-9}\ J$

$U = \frac{1}{2} C V^2 \qquad C = \frac{2(5 \times 10^{-9})}{(10)^2} = 1 \times 10^{-10}\ F.$

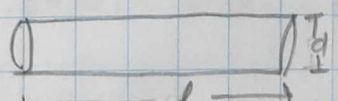
$\frac{2U}{V^2} = C$

$C = \frac{K \varepsilon_0 A}{d}$

$K = \frac{dC}{\varepsilon_0 A} = \frac{(3 \times 10^{-3})(1 \times 10^{-10})}{(8.8542 \times 10^{-12})(1 \times 10^{-3})} = 33.88$

$K = 33.9$

Pregunta 5.



$\rho_{Cu} = 1.72 \times 10^{-8}\ \Omega \cdot m$

$l = 2.50\ m.$

$d = 1 \times 10^{-3}\ m.$

$\Delta V = 3\ V.$

$R = \frac{\rho l}{A} = \frac{(1.72 \times 10^{-8})(2.50)}{2\pi\left(\frac{1 \times 10^{-3}}{2}\right)}$

$R = 0.00547 \times 10^{-3}\ \Omega$

$I = \frac{V}{R} = \frac{3}{0.00547 \times 10^{-3}} = 5.484 \times 10^5\ A.$

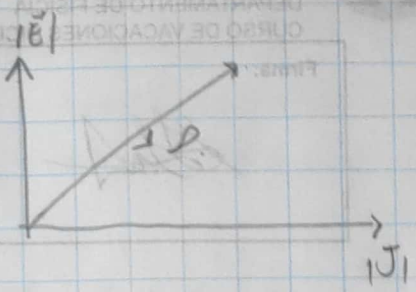
$R = 0.00547 \times 10^{-3}\ \Omega$

$J = \frac{I}{A} = \frac{5.484 \times 10^5}{2\pi\left(\frac{1 \times 10^{-3}}{2}\right)(2.5)}$

$J = 69.82 \times 10^6\ A/m^2$

$J = 69.8 \times 10^6\ A/m^2$

Pregunta 6:



$Y = P_{end} \times \pm b$

$|E| = \rho J$

$|E| = \rho J$

Pregunta 7

P = 2.5 HP (1 HP = 746w) usa 2.5 h/día

Energía = Q1.20 / kW·h

1 mes = 30 días

1 mes = 2.5 × 30 = 75 h.

$P = 2.5\ HP = \frac{746w}{1\ HP} = 1865\ w = 1.865\ kW$

Energía Consumida = $(1.865 \times 10^3)(75) = 139.9\ kW \cdot h$

Costo Energía = $(1.20)(139.9) = Q167.88$

Costo = Q167.88

Pregunta 4:

$T_0 = 20°$

$T = 70°$

$\rho(T) = \rho_0 [1 + \alpha (T - T_0)]$ $\rho_T = 2\rho_0$

$2\rho_0 = \rho_0 [1 + \alpha (70 - 20)]$

$2\rho_0 = \rho_0 [1 + \alpha (50)]$

$\frac{2\rho_0}{\rho_0} = 1 + \alpha (50)$

$2 - 1 = \alpha (50)$

$\frac{1}{50} = \alpha$

$\alpha = 0.02$

$\alpha = 20 \times 10^{-3}\ °C^{-1}$

Pregunta 9: $R_2 = 80\ \Omega$ $V = 135\ V$

$R_4 = 60\ \Omega$

c) $V = IR$

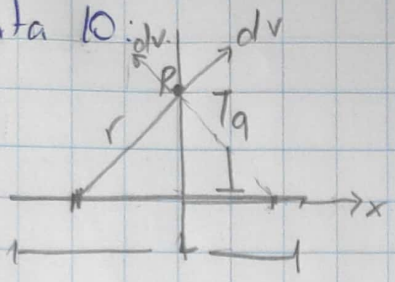
$Req_{A-B} = R_2 + R_4 =$ $I = \frac{V}{R} = \frac{175}{140} = 4.37\ A$

$Req_{A-B} = 80 + 60 = 140\ \Omega$.

$Req_{AB} = 140\ \Omega$.

$I = 4.37\ A$.

Pregunta 10:



$$dV = \frac{k\,dq}{r}$$

$$dq = \lambda\,dx \qquad \lambda = \frac{Q}{L}$$

$$r^2 = a^2 + x^2$$

$$r = \sqrt{x^2 + a^2}$$

$$V = \int \frac{k\,\lambda\,dx}{(x^2+a^2)^{1/2}}$$

$$V = \frac{kQ}{L}\int \frac{dx}{(x^2+a^2)^{1/2}}$$

$$V = \frac{kQ}{L}\int \frac{dx}{(x^2+a^2)^{1/2}}$$

Pregunta 8:

$C_1 = 1.50\ mF$ $C_4 = 8\ mF$

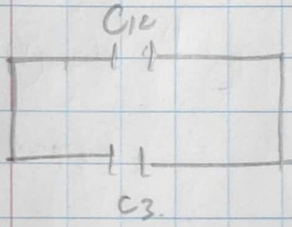
$C_2 = 4.50\ mF$

$C_3 = 2.00\ mF$.

a) C_2 y C_1 Paralelo

$$C_{12} = C_1 + C_2 =$$

$$C_{12} = (1.50\times10^{-3}) + (4.50\times10^{-3}) = 6\times10^{-3}$$



$C_{12} \parallel C_3$

$$C_{eq} = C_{12} + C_3 = 6\times10^{-3} + 2\times10^{-3} = 8\times10^{-3}\ F.$$

$$C_{eq} = 8\times10^{-3}\ F.$$

C_4 serie C_{123}.

$$C_A = C_{4123} = \frac{1}{\frac{1}{8\times10^{-3}} + \frac{1}{8\times10^{-3}}} = 4\times10^{-3}.$$

Pregunta 2:

$$W = -q_0\Delta V = -q_0(V_f - V_0).$$

$$W = -(1.6022\times10^{-19})(30-70) = 6.40\times10^{-18}\ J$$

$$W = 6.40\times10^{-18}.$$