



SEXTA PRUEBA CALIFICADA

CICLO BÁSICO

SOLUCIONARIO

Admisión
2018 - 1

TIPO DE PRUEBA: TEMA

R

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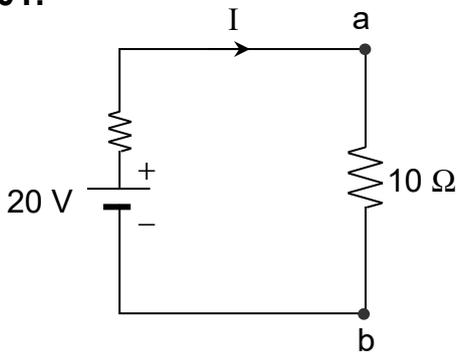
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FÍSICA

01.



$$I = \frac{20}{10,5} = 1,9 \text{ A}$$

$$V_{ab} = (1,9)(10) = 19,04 \text{ V}$$

RESPUESTA: 19 V

E

02.

$$6I_1 - 2I_2 = -2$$

$$-2I_1 + 2I_2 = 10$$

$$I_1 = 2 \text{ A}$$

$$I_2 = 7 \text{ A}$$

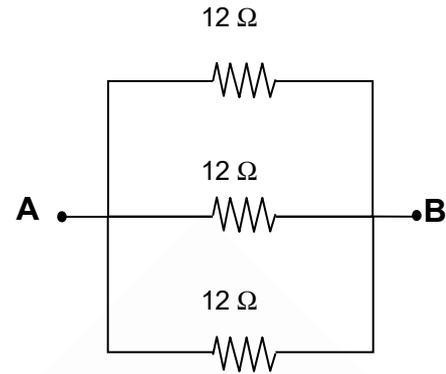
$$2 \Omega \quad I = 5 \text{ A}$$

$$P = (5^2)(2) = 50 \text{ W}$$

RESPUESTA: 50 W

C

03.

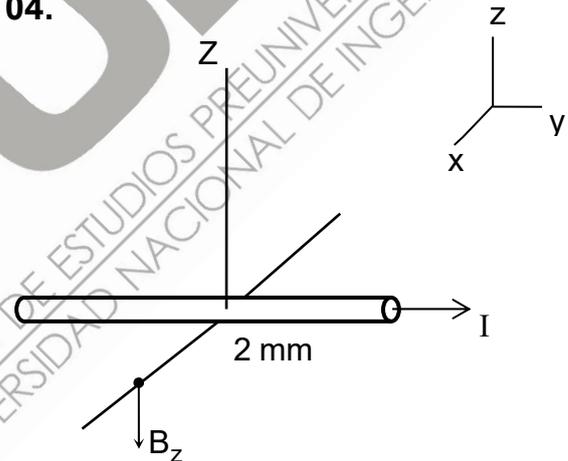


$$R_{AB} = 4 \Omega$$

RESPUESTA: 4 Ω

A

04.



$$B_z = \frac{\mu_0 I}{2\pi r} = \frac{(4\pi \times 10^{-7})(50)}{2\pi (2 \times 10^{-3})}$$

$$B_z = 5 \times 10^{-3} \text{ T}$$

$$B_z = 5 \text{ mT} (-\hat{k})$$

RESPUESTA: $-5\hat{k} \text{ mT}$

D

05.

I. F

El flujo magnético varía

II. F

El flujo disminuye en B. La corriente por R_2 es antihoraria.

III. F

El flujo aumenta en A, la corriente por R_1 es horario.

RESPUESTA: F F F

e

06.

$$\varepsilon = \frac{\Delta\phi}{\Delta t} = \frac{40 \text{ m Wb}}{200 \text{ ms}}$$

$$\varepsilon = 0,2 \text{ V}$$

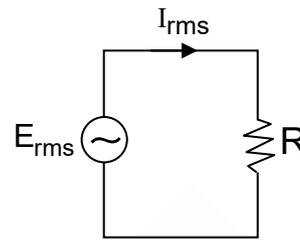
$$i = \frac{\varepsilon}{R} = \frac{0,2 \text{ V}}{0,1 \Omega}$$

$$i = 2 \text{ A}$$

RESPUESTA: 2,0 A

B

07.



$$E_{\text{rms}} = 70,7 \text{ V}$$

$$P_m = 100 \text{ W}$$

$$I_{\text{rms}} = \frac{P}{E_{\text{rms}}} = \frac{100}{70,7}$$

$$I_{\text{rms}} = 1,41 \text{ A}$$

$$I_{\text{máx}} = 1,41\sqrt{2} \text{ A}$$

RESPUESTA: $1,41\sqrt{2} \text{ A}$

B

QUÍMICA

08. $\bar{M}(\text{CO}(\text{NH}_2)_2) = 60 \text{ g/mol}$

$$\%N = \frac{2 \times 14}{60} \times 100\% = 46,7\%$$

RESPUESTA: 46,7

(A)

09. $\bar{M}_{\text{FM}} = 166,1 \text{ g/mol}$

C = 57,83% H = 3,64% O = 38,53%

Hallando "FE"

$$\left. \begin{aligned} C &= \frac{57,83}{12} = \frac{4,82}{2,41} = 2 \times 2 = 4 \\ H &= \frac{3,64}{1} = \frac{3,64}{2,41} = 1,5 \times 2 = 3 \\ O &= \frac{38,53}{16} = \frac{2,41}{2,41} = 1 \times 2 = 2 \end{aligned} \right\} \begin{aligned} \text{FE} &= \text{C}_4\text{H}_3\text{O}_2 \\ \bar{M}_{\text{FE}} &= 83 \end{aligned}$$

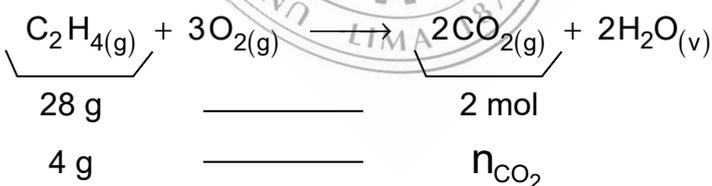
Hallado "FM"

$$k = \frac{\bar{M}_{\text{FM}}}{\bar{M}_{\text{FE}}} = \frac{166,1}{83} = 2 \Rightarrow \text{FM} = (\text{C}_4\text{H}_3\text{O}_2)_2$$

RESPUESTA: $\text{C}_4\text{H}_3\text{O}_2$ y $\text{C}_8\text{H}_6\text{O}_4$

(C)

10.

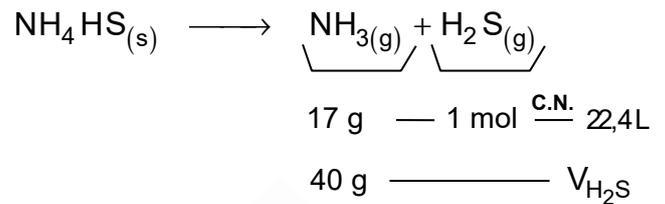


$$\therefore n_{\text{CO}_2} = \frac{4 \times 2}{28} = 0,2857$$

RESPUESTA: 0,2857

(B)

11.

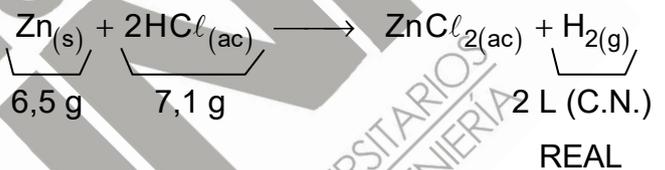


$$V_{\text{H}_2\text{S}} = \frac{40 \times 22,4}{17} = 52,7 \text{ L}$$

RESPUESTA: 52,7

(A)

12.

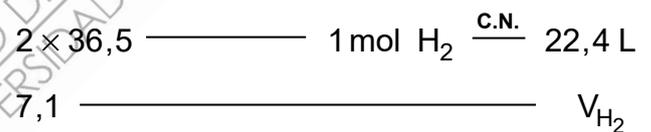


Hallando R.L.:

$$\text{Zn} : \frac{6,5}{65} = 0,1$$

$$\text{HCl} : \frac{7,1}{2 \times 36,5} = 0,097 \text{ (R.L.)}$$

De la RxN:

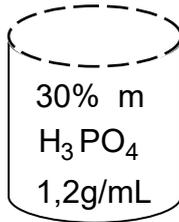


$$\%R = \frac{2}{2,1786} \times 100\% = 91,80 \%$$

RESPUESTA: 91,80

(A)

13.



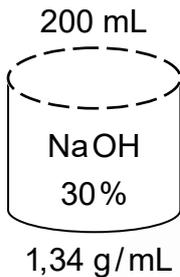
$$C_M = \frac{\%m \times \rho_{\text{sol}} \times 100}{M_{\text{STO}}}$$

$$C_M = \frac{30 \times 1,2 \times 10}{98} = 3,7 \text{ M}$$

RESPUESTA: 3,7

C

14.



$$C_M = \frac{30 \times 1,34 \times 10}{40}$$

$$C_M = 10,05 \text{ M}$$

Dilución:

$$C_1 V_1 = C_2 V_2$$

$$(10,05)(200) = (3,35) V_2$$

$$V_2 = 600 \text{ mL}$$

$$V_{\text{H}_2\text{O}} (\text{agregado}) = 600 - 200 = 400 \text{ mL}$$

RESPUESTA: 400

D

ARITMÉTICA

15.

$$108 = 36 \times 3 = 2^2 \cdot 3^3$$

$$(2n + 1)(3n + 1) = 117$$

$$n = 4$$

RESPUESTA: 4

B

16. $5^3 \cdot (2^2 \cdot 3)^x = 2^{2x} \cdot 3^x \cdot 5^3$

$$\begin{array}{ccc} 1 & 1 & 1 \\ 2 & 3 & 5 \\ 2^2 & 3^2 & 5^2 \\ \vdots & \vdots & \vdots \end{array}$$

$$2x \cdot x = 32$$

$$x = 4$$

$$N = 2^8 \cdot 3^4 \cdot 5^3$$

\therefore 3 ceros

RESPUESTA: 3

C

17.

$$N = a \cdot b^6$$

$$= 13 \cdot 5^6$$

$$= 203125$$

La suma de cifras de N es 13

RESPUESTA: 13

A

18.

$$x^2 y^4 = \overline{abb}$$

$$3^2 2^4 = \overline{abb}$$

$$3^2 \cdot 2^4 = 144$$

$$a + b = 5$$

RESPUESTA: 5

(C)

19.

$$\overline{2a49} = \overset{\circ}{29}$$

$$2049 + 100a = \overset{\circ}{29}$$

$$\overset{\circ}{29} + 19 + \left(\overset{\circ}{29} + 13 \right) a = \overset{\circ}{29}$$

$$\overset{\circ}{29} + (13a + 19) = \overset{\circ}{29}$$

$$\downarrow$$

$$3$$

RESPUESTA: 3

(D)

20.

$$\overline{ba(2a)} = \overset{\circ}{6}$$

$$b + 3a = 3 \rightarrow b = 3 - 3 = 0 \text{ ó } 9$$

$$a = 0; 1; 2; 3 \text{ ó } 4$$

$$\therefore 3 \times 5 = 15$$

RESPUESTA: 15

(D)

$$21. n^4 - 2018 = \overset{\circ}{5} + r$$

$$\left(\overset{\circ}{5} \pm 1 \right)^4 - \left(\overset{\circ}{5} + 3 \right) = \overset{\circ}{5} + r \rightarrow r = 3$$

$$\left(\overset{\circ}{5} \pm 2 \right)^4 - \left(\overset{\circ}{5} + 3 \right) = \overset{\circ}{5} + r \rightarrow r = 3$$

RESPUESTA: 3

(C)

ÁLGEBRA

22.

$$(3^x)^2 - 11(3^x) + 18 = 0$$

$$(3^x - 9)(3^x - 2) = 0$$

$$x_1 = 2 \quad x_2 = \log_3(2)$$

$$x_1 + x_2 = \log_3 9 + \log_3 2 = \log_3(18)$$

RESPUESTA: $\log_3(18)$

(A)

23.

$$\text{Como } -x^2 + 2x \leq 1$$

$$\Rightarrow 0 < 2^{-x^2 + 2x} \leq 2$$

$$\Rightarrow R_f = \langle 0; 2 \rangle, \quad a = 0, \quad b = 2$$

$$\therefore T = a + 2b = 4$$

RESPUESTA: 4

(D)

24.

I. V (Teoría)

II. F, $A = \begin{pmatrix} 3 & 1 \\ 0 & 1 \end{pmatrix}$ $B = \begin{pmatrix} 2 & 1 \\ 0 & 1 \end{pmatrix}$

III. V (Teoría)

RESPUESTA: V F V

a

25.

$$X = A^{-1} \cdot C - B$$

$$= \begin{pmatrix} 2 & -5 \\ -1 & 3 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix} - \begin{pmatrix} -2 & -5 \\ 2 & 2 \end{pmatrix}$$

$$= \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$$

RESPUESTA: $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$

D

26.

$$X = \begin{pmatrix} 4 & 3 \\ 2 & 2 \end{pmatrix}^{-1} \cdot \begin{pmatrix} 29 & -1 \\ 16 & 0 \end{pmatrix}$$

$$\Rightarrow X = \begin{pmatrix} 5 & -1 \\ 3 & 1 \end{pmatrix}$$

\therefore suma de elementos = 8

RESPUESTA: 8

B

27.

Del sistema $x = \frac{n-5}{3}$, $y = \frac{2n+5}{3}$

como $x > 0 \wedge y > 0 \Rightarrow n > 5$

$\therefore n_{\min} = 6$

RESPUESTA: 6

C

28.

$$\det A = m^2 - 1 = 8 \Leftrightarrow m = \pm 3$$

Si $m = -3 \Rightarrow$ sist compatible

indeterm $\Rightarrow k_1 = -3$

Si $m = 3 \Rightarrow$ sist incompatible \Rightarrow

$$k_2 = 3$$

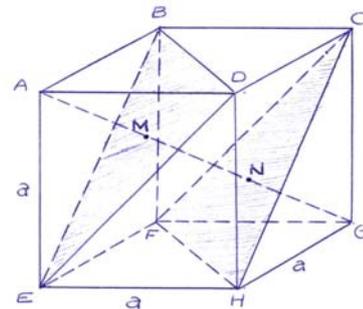
$$\therefore 5k_1 + 2k_2 = -15 + 6 = -9$$

RESPUESTA: -9

D

GEOMETRÍA

29.



En la figura, la distancia a determinar es MN

Además: $AM = MN = NG$ y

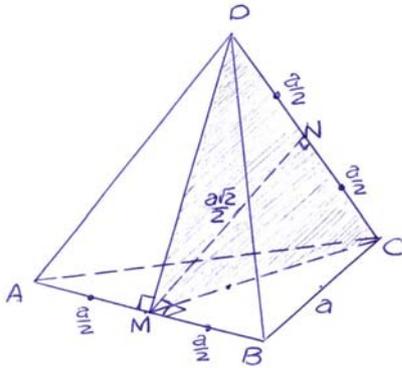
$$AG = a\sqrt{3}$$

Luego: $MN = \frac{a\sqrt{3}}{3}$

RESPUESTA: $MN = \frac{a\sqrt{3}}{3}$

C

30.



Por teorema: $MN = \frac{a\sqrt{2}}{2}$

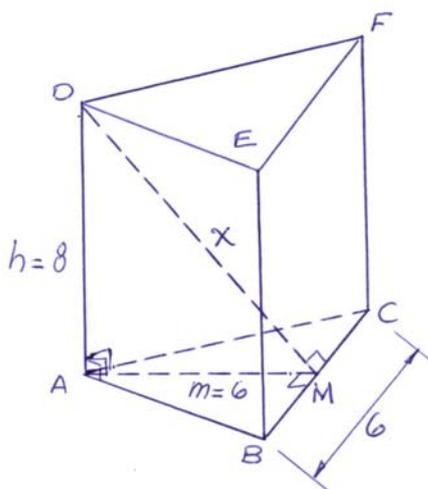
Luego: $S_{CMD} = \frac{1}{2} \left(\frac{a\sqrt{2}}{2} \right) (a)$

$$S_{CMD} = \frac{a^2\sqrt{2}}{4}$$

RESPUESTA: $S_{CMD} = \frac{a^2\sqrt{2}}{4}$

B

31.



Del enunciado:

$$V = A_B \times h = \frac{1}{2} (6 \times m) \cdot (8) = 144$$

⇒ $m = 6$

En el triángulo rectángulo DAM

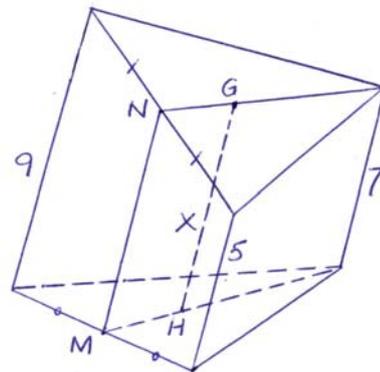
$$DM = \sqrt{8^2 + 6^2}$$

$$DM = 10$$

RESPUESTA: $DM = 10 \text{ u}$

A

32.



En la figura, por teorema

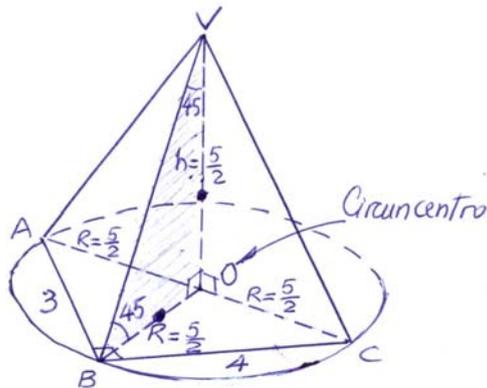
$$x = \frac{9 + 7 + 5}{3}$$

$$x = 7$$

RESPUESTA: $GH = 7 \text{ u}$

B

33.



En la figura, el triángulo ABC es rectángulo.

$$\Rightarrow AC = 2R = 5 \Rightarrow R = \frac{5}{2}$$

Luego en el triángulo rectángulo VOB

$$h = \frac{5}{2}$$

Finalmente,

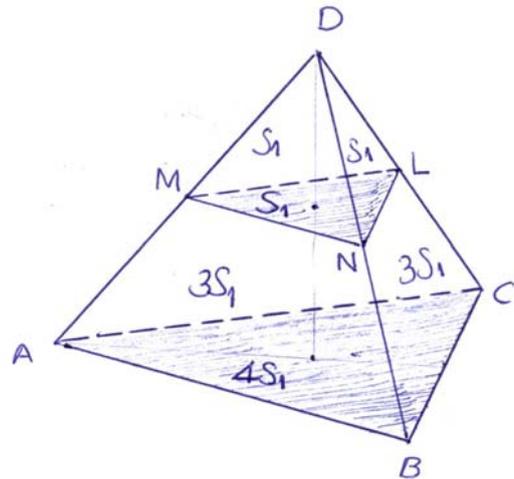
$$V_{V-ABC} = \frac{1}{3} A_B h = \frac{1}{3} \left(\frac{3 \times 4}{2} \right) \left(\frac{5}{2} \right)$$

$$V_{V-ABC} = 5$$

RESPUESTA: $V_{V-ABC} = 5 u^3$

D

34.



En la figura:

$$A_{T_{D-MNL}} = 4S_1$$

$$A_{T_{MNL-ABC}} = 9S_1 + S_1 + 4S_1 = 14S_1$$

$$A_{T_{D-ABC}} = 16S_1 = S \Rightarrow S_1 = \frac{S}{16}$$

Luego:

$$A_{T_{MNL-ABC}} = 14 \left(\frac{S}{16} \right)$$

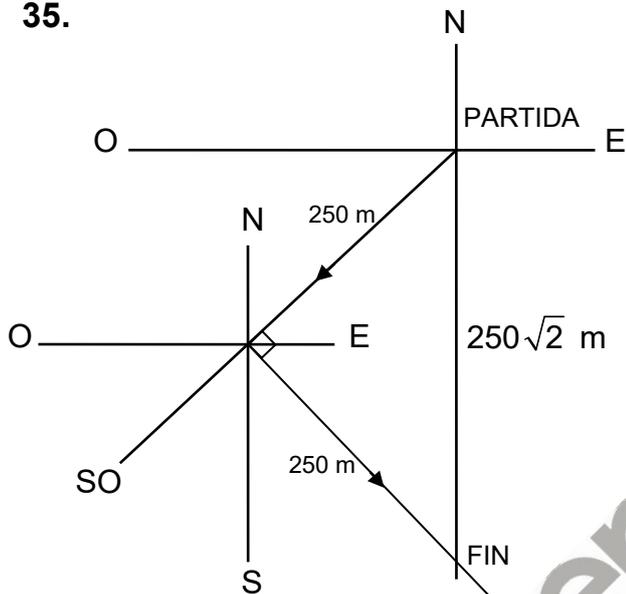
$$A_{T_{MNL-ABC}} = \frac{7}{8} S$$

RESPUESTA: $A_{T_{MNL-ABC}} = \frac{7}{8} S$

A

TRIGONOMETRÍA

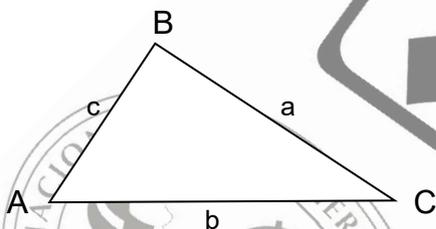
35.



RESPUESTA: $250\sqrt{2}$

E

36.



$$S = \frac{1}{2} bc \sin(A)$$

$$= \frac{1}{2} 2R \sin(B) \cdot 2R \sin(C) \cdot \sin(A)$$

$$= 2R^2 \sin(A) \sin(B) \sin(C)$$

RESPUESTA:

$2R^2 \sin(A) \sin(B) \sin(C)$

C

37.

$$\frac{\sin(C) + \sin(A)}{a + c}$$

$$\frac{\sin(C) + \sin(A)}{2R(\sin(A) + \sin(C))}$$

$$\frac{1}{2R}$$

RESPUESTA: $\frac{1}{2R}$

E

38.

$$\frac{2}{\sin(A)} \cdot \sqrt{\frac{(p-b)(p-c)^2}{bc}}$$

$$\frac{2 \cdot \sin^2\left(\frac{A}{2}\right)}{2 \sin\left(\frac{A}{2}\right) \cos\left(\frac{A}{2}\right)}$$

$$\tan\left(\frac{A}{2}\right)$$

RESPUESTA: $\tan\left(\frac{A}{2}\right)$

A

39.

$$\sqrt{\frac{p(p-a)^2}{bc}} + \sqrt{\frac{(p-b)(p-c)^2}{bc}} = 2 \cdot \frac{1}{2} \frac{bc \cdot \text{sen}(A)}{bc}$$

$$\cos^2\left(\frac{A}{2}\right) + \text{sen}^2\left(\frac{A}{2}\right) = \text{sen}(A)$$

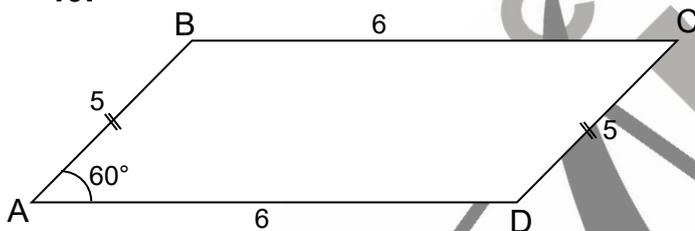
$$1 = \text{sen}(A)$$

$$A = 90^\circ$$

RESPUESTA: 90°

C

40.



$$S = 2 \cdot \frac{1}{2} 5 \times 6 \text{sen}(60^\circ) \\ = 15\sqrt{3}$$

RESPUESTA: $15\sqrt{3}$

C