EXAMEN FINAL - CICLO INTENSIVO DE VERANO 2018

(Grupo I y Grupo II)

FÍSICA

1

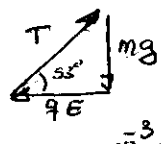
$\Delta \ell = \ell_0 \alpha \Delta T$

$\Delta \ell = (2)(4\times10^{-6})(50)$

$\Delta \ell = 4\times10^{-4} = 0,0004$

D

2

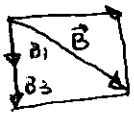


$Fa = 30\times10^{-3} = 0,03\ N$

$E = \frac{0,03}{40\times10^{-3}} = 0,75$

E

3



$B_1 = 1,6\times10^{-4}$

$B_1 + B_3 = 3,2\times10^{-4}$

$B_2 = 1,6\times10^{-4}$

$B = \sqrt{(3,2\times10^{-4})^2 + (1,6\times10^{-4})^2}$

$|\vec{B}| = 357,77\ \mu T$

B

4

$\mathcal{E} = NBAw \operatorname{Sen} wt$

$\mathcal{E}_{max} = (1000)(10^{-3})(10\times10^{-2})(50)$

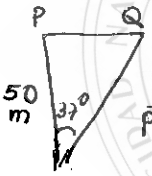
$\mathcal{E}_{max} = 0,05\ V$

$i_{max} = \frac{0,05}{0,5} = 0,1\ A$

$i_{max} = 100\ mA$

E

5



$(1)(4/5) = 4/3 \operatorname{Sen}\theta_2$

$\theta_2 = 37°$

$tg37° = \frac{3}{4}(50) = 37,5$

$\overline{PS} = 75\ cm$

D

6

$\frac{8+(q-2)}{q} = \frac{6+q}{q} = \frac{0}{1}$

$\frac{6+q}{q} = \frac{-2}{2}$

$q^2 - 4q - 12 = 0$

$q = 6\ m$

A

7

$E_{kmax} = h\nu - \phi$

$\phi = \frac{6,63\times10^{-34}(3\times10^{8})}{(1,6\times10^{-19})(400\times10^{-9})} - 0,8\ eV$

$\phi = 3,1\ eV - 0,8\ eV$

$\phi = 2,3\ eV$

B

QUÍMICA

8

$pH = 12,7 \Rightarrow pOH = 1,3$

$[NaOH] = 0,05\ M$

$0,05\times40\ g$ — $1\ L$

m — $2\ L$

$m_{NaOH} = 4\ g$

D

9

$HCHO \rightleftharpoons CO + H_2$

eq: $(0,1-0,02)$ $(0,02)$ $(0,02)$

$K_c = \frac{(\frac{0,02}{2})^2}{(\frac{0,08}{2})} = 2,5\times10^{-3}$

C

10

EL $H_2C_2O_4$ PRESENTA MAYOR FUERZA RELATIVO DE ACIDEZ

D

11

$E^\circ_{celda} = E^\circ_{ox} + E^\circ_{RED}$

$0,59 = E^\circ_{RED} + 1,36$

$E^\circ_{ox} = -0,77\ V$

B

12

$M^{2+} + 2e^- \rightarrow M$

$q = 1,5\times30\times60 = 2700\ C$

$2\times96500\ C$ — $\bar{A}r(M)\ g$

$2700\ C$ — $0,889\ g$

$\bar{A}r(M) = 63,5$

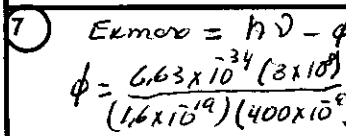
C

13

2,3,5-TRIMETIL-4-PROPILHEPTANO

B

14



2,2,4-TRIMETILPENTANO

B

ARITMÉTICA

15

$A = 17P$, $B = 17q$, $A > B$

$A^2 + B^2 = 30634 \rightarrow P^2 + q^2 = 106$

$q = 5 \Rightarrow P = 9$

$A = 17\times9 = 153$

Σ cifras 9

A

16

$\overline{abba} = \begin{cases} 5 \\ 7 \end{cases}$

$\frac{a=5}{5bb5} = 7 \Rightarrow 5b = 7$

$-1\ 3\ 2\ 1$

$b = 0; 7;$ Números 2

B

17

$Me = 40 + \frac{\frac{100}{2} - 40}{20}\times10$

$Me = 45$

B

18

$2(\frac{1}{4} + \frac{1}{8}) = \frac{3}{4}$

Luego $(\frac{1}{3} - \frac{1}{8})T = \frac{3}{4}$

$T = 3h\ 36\ min$

B

19

$MCD(3^{18}-1, 3^{12}-1, 3^{24}-1) =$

$3^6 - 1 = 728 = 2^3\times7\times13$

$CD = 4\times2\times2 = 16$

C

20

12	21	31	41
13	23	32	42
14	24	34	43

$P = \frac{8}{12} = \frac{2}{3}$

D

21

$20000 \le 231k \le 299992$

$865,8 \le k \le 1298,6$

$k: 872, 882, \ldots, 1292$

$\#: \frac{1292-872}{10} + 1 = 43$

C

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ÁLGEBRA

22

1	1	-1	n	-1
1		1	-1	
-1			0	0
	1	0	n-1	-1

$\Sigma coef = n-1 = 5 \Rightarrow n = 6$ **E**

23

$f(x) = \left(x+1+\frac{4}{x+1}\right)+10$

$\leq -2(2)+10 = 6$

$\max f(x) = 6 \Leftrightarrow x = -3$ **A**

24

$x_1+x_2+x_3 = 0$

$x_1x_2 + x_1x_3 + x_2x_3 = 3$

$x_1x_2x_3 = 1$ (35)

$\Rightarrow f(x) = x^3+3x-1-p(3)$

$\frac{f(x)}{x-4} \Rightarrow r = f(4) = 40$ **B**

25

$\exists = [1,+\infty\rangle$

Elev al $\square$: $\log x = \left(\log x^{\frac{1}{2}}\right)^2$

$(\log x)^2 - 4(\log x) = 0$

$\log x = 0 \quad \vee \quad \log x = 4$

$x_1 = 1 \qquad x_2 = 10^4$

$x_1 + x_2 = 10001$ **B**

26

$f = \exp \circ g$, $g(x) = x^2-4x$

exp es creciente en $\mathbb{R}$

- g crec en $\langle 2,+\infty\rangle \Rightarrow$ f crec en $\langle 2,+\infty\rangle$
- g decrec en $\langle -\infty, 2\rangle \Rightarrow$ f es decrec en $\langle -\infty, 2\rangle$

$\therefore$ f es crec en $\langle 4,\infty\rangle$ **C**

27

De las ec 1 y 2: $x-y=9$

$\Rightarrow \begin{cases} 3-(y+1)^2 = 3 \\ x+8y = 0 \\ x-y = 9 \end{cases} \Rightarrow \begin{matrix} x=8 \\ y=-1 \end{matrix}$

$S = \{(8,-1)\}$

Rpta VFF **C**

28

I. $x_n = \frac{n!}{5^n}$, $\frac{x_{n+1}}{x_n} = \frac{n+1}{5} \to \infty$ ..... F

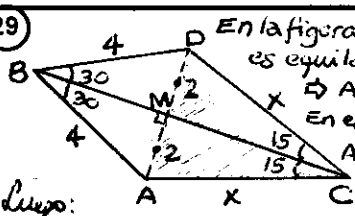
II. F, " $\sum \frac{1}{n}$

III. V (Teoría)

Rpta FFV **D**

GEOMETRÍA

29

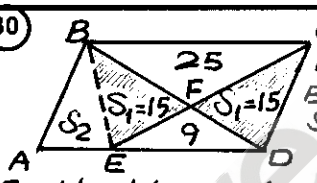


En la figura, el ΔABD es equilátero $\Rightarrow AD = 4$

En el ΔADC $AD = l_{12} = 4$

Luego: $l_{12} = x\sqrt{2-\sqrt{3}} = 4 \Rightarrow x = 4\sqrt{2+\sqrt{3}}$ **E**

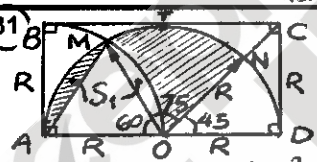
30



En el trapecio EBCD: $S_1 = \sqrt{25}\sqrt{9} = 15$

En el paralelogramo ABCD: $S_{ABD} = S_{BCD} \Rightarrow S_2 = 16$ $\therefore S_{ABCE} = 31u^2$ **D**

31

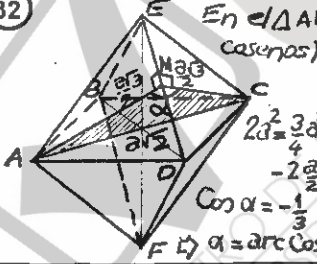


En la figura: $S_x = S_{\text{sector MON}} - S_1$

$S_x = \pi R^2 \cdot \frac{75}{360} - \left(\frac{\pi R^2}{6} - \frac{R^2\sqrt{3}}{4}\right)$

$\Rightarrow S_x = \frac{R^2}{24}(\pi + 6\sqrt{3})$ **B**

32



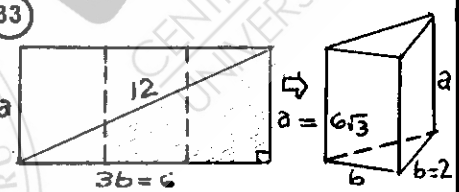
En el ΔAMC (Ley de cosenos):

$2a^2 = \frac{3}{4}a^2 + \frac{3}{4}a^2 - 2\frac{a}{2}\sqrt{3}\cdot\frac{a}{2}\sqrt{3}\cdot\cos\alpha$

$\cos\alpha = -\frac{1}{3}$

$\Rightarrow \alpha = \arccos\left(-\frac{1}{3}\right)$ **D**

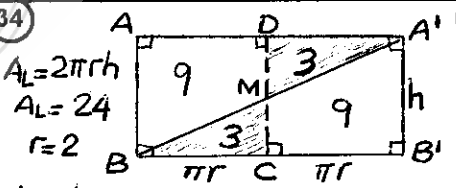
33



$A_T = A_L + 2A_\theta$

$A_T = (6\sqrt{3})(6) + 2\left(\frac{2^2\sqrt{3}}{4}\right) \Rightarrow A_T = 38\sqrt{3}u^2$ **A**

34



$A_L = 2\pi rh$

$A_L = 24$

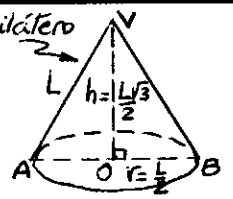
$r = 2$

$\Rightarrow \pi h = 6$

Luego: $V = \pi r^2 h \Rightarrow V = 24u^3$ **B**

35

Cono Equilátero



$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi\left(\frac{L}{2}\right)^2 \cdot \frac{L\sqrt{3}}{2}$

$V = \frac{1}{24}\pi L^3\sqrt{3}$ **B**

TRIGONOMETRÍA

36

$\frac{2x}{3} - \frac{\pi}{4} \neq n\pi$

$\Rightarrow x \neq (4n+1)\frac{3\pi}{8}$

$D_f = \mathbb{R} - \left\{(4n+1)\frac{3\pi}{8}\right\}$ **A**

37

$\text{Sen}^{-1}\left(\frac{x-1}{5}\right) = \text{Sec}^{-1}\left(\frac{5}{\sqrt{5x+6}}\right) = \theta$

$\Rightarrow \text{Sen}(\theta) = \frac{x-1}{5}$ $\text{Sec}(\theta) = \frac{5}{\sqrt{5x+6}}$

De $\text{Sen}^2(\theta)+\cos^2(\theta) = 1 \Rightarrow x_0 = 3$

Piden $3x_0 - 2 = 7$ **C**

38

De:

$\frac{1-2\text{Sen}^2(x)\cos^2(x)}{6} = \frac{1-\text{Sen}^2(x)(\cos^2 x)}{5}$

$\text{Sen}(2x) = \pm\frac{\sqrt{2}}{2}$

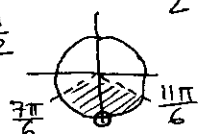
$2x = (2K+1)\frac{\pi}{4}$

$x = (2k+1)\frac{\pi}{8}$ **B**

39

$2\text{Sen}(x) + 1 < 0$, $x \neq \frac{K\pi}{2}$

$\text{Sen}(x) < -\frac{1}{2}$

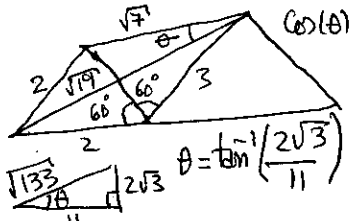


$x \in \left\langle \frac{7\pi}{6}; \frac{11\pi}{6} \right\rangle - \left\{\frac{3\pi}{2}\right\}$ **C**

40

$2\sqrt{7}\sqrt{19}\cos(\theta) = \sqrt{7}^2 + \sqrt{19}^2 - 2^2$

$\cos(\theta) = \frac{11}{\sqrt{133}}$



$\theta = \tan^{-1}\left(\frac{2\sqrt{3}}{11}\right)$ **B**

41

$C = (0; y_0)$

De: $\sqrt{5^2+(y_0+4)^2} = \sqrt{7^2+(y_0-2)^2}$

$\Rightarrow y_0 = 1 \Rightarrow C = (0;1)$, $r = 5\sqrt{2}$

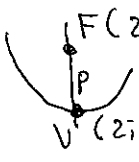
$\mathcal{C}: (x-0)^2 + (y-1)^2 = (5\sqrt{2})^2$

$x^2 + y^2 - 2y - 49 = 0$ **A**

42

$P: (x-2)^2 = 4\times 2(y-5)$

$\Rightarrow p = 2$, $V = (2;5)$



$a = 2$, $b = 7$

$3a - 2b = -8$ **C**